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STORIES OF
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AND HIS
PLANT SCHOOL

CHARLES SCRIBNER'S SONS

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Stories of Luther Burbank
and his plant school

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Luther Burbank

STORIES OF
LUTHER BURBANK
AND
HIS PLANT SCHOOL

BY
EFFIE YOUNG SLUSSER, MARY BELLE WILLIAMS
EMMA BURBANK BEESON

EDITED BY
LILLIAN McLEAN WALDO

WITH AN INTRODUCTION BY LUTHER BURBANK

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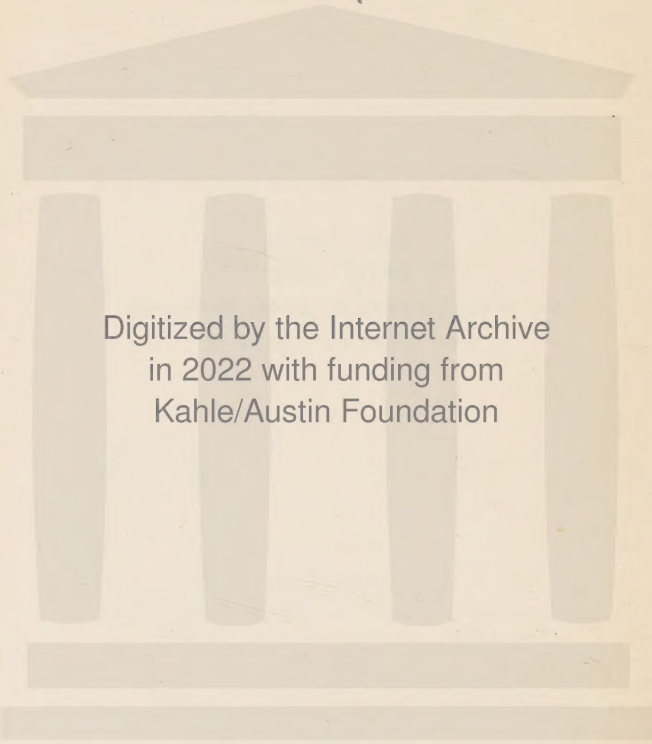
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DEDICATED
TO LUTHER BURBANK, LOVER OF PLANTS
AND LOVER OF CHILDREN



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INTRODUCTION

Educational methods have changed. Fifty years ago the education of children was on the theory that they were all naturally bad, while to-day it has dawned upon teachers and also the public that there are both good and bad tendencies in every child, and that education should not attempt to make children over according to rule. They should be led to love and cherish and cultivate the best tendencies, while the undesirable ones will fade from neglect and lack of encouragement. Mother Nature teaches many a lesson not to be learned in school. True education should promote a happy development along the natural tendencies rather than provide punishments for not bending to arbitrary rules to be obeyed. To be sure, discipline is needed, but it should be along natural lines of development, rather than by the too arbitrary "Thou shalt, and thou shalt not." A child should fully realize that greatly upon his own actions and character depend his own happiness or punishment, thus fewer laws and rules would be necessary. Modern educational methods rely more upon a fundamental love of nature and of our fellow-travellers through life than upon force, punishment, and the ability to learn certain generally accepted forms of words and phrases.

All teachers who are such from love of their work have

felt the need of some pleasing yet practical reader which while providing everyday work should be at the same time so constructed as to be in kindly sympathy and accord with the child's mind. The three prominent educators of long experience who have collaborated with the publishers of this work, while quite faithfully delineating the methods employed in producing newer and far more valuable plants, trees, fruits, and flowers, have confined themselves strictly to the facts, and have described the methods in a most pleasing form for the child.

With the sincere hope that this book will help teachers and pupils to admire each other in their mutual love of nature, I give it my welcome, being fully assured of its abundant success.

A handwritten signature in dark ink, reading "Luther Burbank". The script is elegant and cursive, with a large, sweeping initial "L" and a long, horizontal flourish extending to the right.

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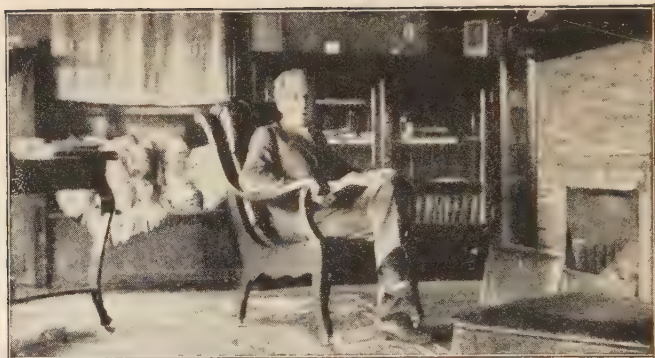
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Mr. Burbank in his library.

"And Nature, the old nurse, took
The child upon her knee,
Saying, 'Here is a story book
Thy Father has written for thee.'

'Come, wander with me,' she said,
'Into regions yet untrod;
And read what is still unread
In the manuscript of God.'

And he wandered away and away
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the universe.

And whenever the way seemed long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more wonderful tale."

—LONGFELLOW.

STORIES OF LUTHER BURBANK AND HIS PLANT SCHOOL

PART I—THE CHILD

CHAPTER I

THE HOME

When, on the 7th of March, 1849, a tiny boy baby came⁻¹⁹²⁶ to a happy family in the town of Lancaster, Massachusetts, nobody knew that a great naturalist's life had just begun. The snow was beginning to melt on the New England hillsides, and under the ground millions of flowers were awakening.

Only the pretty pussy willows, however, were brave enough to venture out. Quickly they put on their soft gray fur coats, pulled soft gray fur caps over their tiny heads, and hurried up into the chilly spring air to be the first to welcome their dear friend, little Luther Burbank.

The Burbank family lived in a large brick house, set some distance back from the road. Over it swayed the graceful branches of a great elm tree, in which every year the golden orioles hung their swinging cradles and poured out their notes of joy.

In the summer time the yard was aglow with bright flowers; and during the winter months geraniums, fuchsias, and pinks bloomed in the windows of the cheery living



Pussy willows.

room. Even as a baby the child loved these flowers, and nothing pleased him more than one of these bright blossoms placed in his hand. He never destroyed it; but if a petal fell, the baby hands tried to replace it, that again the flower might be perfect.

Once, when he was beginning to toddle about, he was found in the yard patiently endeavoring to reset a

little plant in the ground. At first it was thought that he had pulled it up and was trying to undo the mischief; but it was soon learned that the uprooting of the plant was the work of another, and that it was only his grief at its destruction which led to his efforts to make it grow again.

Soon the wild flowers around the home became his companions and playmates. On the hillside, under the elm tree in front of the house, grew some wild daisies. These



Burbank's childhood home in New England.

he watered and cherished when he was so small that he could scarcely carry the little pail of water up the steep hill. The daisy faces became brighter because of his love and care.

Luther was a timid child, shrinking from strangers. When there were guests at the home that he thought might be at the dinner table, he would count the plates, before he learned the numerals, by designating them as "papa's," "mama's," and so on through the family. If more places were found than he could count thus, he would say, "I don't want any dinner," and quietly slip

away with his old maltese cat, whose sympathy he sought in all his troubles.

The work of caring for the bantam chickens, guinea-pigs, white rabbits, and other pets of the household was early assigned to him; for each member of the family was given some task suited to his age and strength. He was fond of these animals, but even then the stronger love for growing plants was noticeable. No flower was commonplace to him. The lupine, the goldenrod, and the buttercup growing by the wayside charmed him.

Near the home was a bank of clean white sand, where the boy Luther spent many happy hours, playing with the other children. He laid out villages with streets, houses, mills, and stores; but always with orchards and gardens, for even his play was constructive, tending to increased beauty by means of plants.

CHAPTER II

THE FLOWER GARDEN

One of the first joys that came into Luther Burbank's life was his mother's flower garden. Here the bright butterfly wing and the flashing rose petal caught his childish eye, and he was quickly drawn into sympathy with the flower world. The mother used to tell this story of his babyhood:

"One morning, as his attention was directed to an especially beautiful blossom, a humming bird, on busy wing, began sipping its nectar from the fuchsia. In an instant the baby hands had caught and were holding the bird, while in a distressed tone he was crying, 'Birdie eat flower! Birdie eat flower!'"

When it was explained that the bird was not injuring the flower but only taking the food that Nature had placed there for its use, Luther quickly allowed it to go unharmed, and ever afterward the visits of birds, bees, and butterflies became to him an added pleasure.

As months and years passed, flowers were more and more his companions. In early spring he saw the bulbs, which had lain all winter apparently lifeless in the cellar, placed in the ground; then he watched the first tiny green shoots as they appeared above the surface. With eager eye he followed their growth each day until iris, golden daffodil, and scarlet tulip gladdened his heart.

He learned that the tiny seeds of phlox, heliotrope, snapdragons, petunias, musk plants, pinks, and other tender annuals* were often sown in boxes and carefully shielded from storm and cold until the soil had been warmed by the summer sun and the little plant had become strong enough to be transplanted into the ground, while the seeds of the hardier sweet peas, candytuft, foxgloves, four-o'clocks, and pansies were early planted in the open garden.

* Annual—living only a year.

The potted plants, which had bloomed in the deep window seat all winter, were also set in the garden. At the same time he observed the swelling buds of the lilac, rose, and jasmine, that had so bravely withstood the cold of the New England winter. Much care and work were expended upon the garden, but the labor was well repaid, for all summer the harvest of blossoms continued.

Purple morning-glories smiled a sweet good morning, great golden sunflowers followed the sun all day in his course across the sky, and tiny blue-eyed forget-me-nots peeped up shyly at the passer-by. Bright-faced pansies, stately lilies, velvety roses, fragrant pinks, poppies, peonies, and many, many other beautiful flowers welcomed the guests to the home.

In this garden, no doubt, more seeds of industry, patience, and love of Nature were sown in the mind of the child than were scattered flower seeds in fertile soil.

CHAPTER III

THE VEGETABLE GARDEN

In the vegetable garden, too, Luther spent much time, planning and dreaming of his life-work. He learned that the gardener has the power to change the forms, sizes, and shapes of plants, to make them appear early or late in season, to make tender ones frost-proof, to mould fruits

and vegetables to almost any size, form, color, or flavor desired, to make corn, grain, and grasses tall or short, and richer in production. In fact he discovered that man could guide plant forces exactly as he did mechanical and chemical forces.

Pulling weeds and hoeing corn tired the muscles, but the growing plants formed a wonderful moving picture that taught beautiful lessons not to be learned in books.

When in early spring the sun warmed the soft, damp earth and it was made mellow and smooth by deep plowing and thorough cultivation, peas, beans, beets, carrots, turnips, and onions were planted. The little tomato, cabbage, pepper, and cauliflower plants were carefully removed from boxes or hotbeds, where the seed had been sown even before the snow had disappeared, and were placed in the ground now ready for them. How eagerly was their growth watched, each tiny new leaf being greeted with joy!

With exultant pride the first bright crimson radishes were pulled from the plot, where the lettuce as it peeped forth from the brown earth spelled in brightest green L-u-t-h-e-r. When, a little later in the season, the sweet corn was planted, the boy, like Hiawatha, would

“Go to wait and watch beside it;
Kept the dark mould soft beside it,
Kept it clean from weeds and insects.

.

Till at length a small green feather
From the earth shot slowly upward,
Then another and another,
And before the summer ended
Stood the maize in all its beauty
With its shining robes about it,
And its long, soft yellow tresses;

.

And still later, when the Autumn
Changed the long green leaves to yellow
And the soft and juicy kernels
Grew like wampum hard and yellow
Then the ripened ears he gathered."

Once when a large cucumber was found growing in a glass bottle, which had a neck barely large enough to admit the stem, no one inquired, for every one knew, who it was that had placed it in the bottle when the great yellow petals were falling and the tiny cucumber was just beginning its growth, and had, day after day, watched its development in its prison house of glass, as it lay hidden beneath a tangle of vines.

In the garden grew curious gourds from which were obtained nest eggs, water bottles, and drinking cups. And the melons! Great, juicy, pink-fleshed watermelons! Was there ever a boy who did not like watermelons? The

muskmelons and squashes grew here also; but the great golden pumpkins were not allowed in this garden. They grew among the corn in the larger field.

Luther was fond of tracing his initials, with the point of a penknife, on the little pumpkins and of watching the letters increase in size as the pumpkins did. A circus parade passed by the field one day, and, as the pumpkins grew to maturity, on them were seen in outline elephants, lions, tigers, and other circus attractions.

These pictured pumpkins caused much merriment and comment when exhibited at the county fair that fall. This, however, did not save them from serving as Jack-o'-lanterns at Hallowe'en. Those which escaped that experience were ready to be made into pie for Thanksgiving dinner. It was of such pumpkins as these that Whittier sang:

"O fruit loved of boyhood the old days recalling,
When woodgrapes were purpling and brown nuts were
 falling,
When wild, ugly faces we carved in its skin,
Glaring out through the dark with a candle within!
When we laughed around the corn heap with hearts all
 atune,
Our chair a broad pumpkin—our lantern the moon,
Telling tales of the fairy that traveled like steam,
In a pumpkin-shell coach, with two rats for her team."

In the garden grew rhubarb with broad green leaves, asparagus and celery, spicy peppergrass and various herbs used in seasoning—thyme, sage, and summer savory. It was also the source of the old-fashioned boiled dinner, once so famous in New England. A large kettle was placed on the fire and in it pieces of salted pork or beef. Later the various vegetables were added according to the time each required for cooking—beets, parsnips, carrots, cabbage, corn, potatoes, beans, peas, and squash, the last three being placed in cloth bags so as not to become mingled with the other vegetables. All were served on a large platter or side dishes. The children coming from school never forgot to seek the cold roasting ears laid away from the noonday meal for their lunch.

Many of the vegetables were stored in the cellar for winter use; crimson beets, yellow and white turnips, silver-skinned onions, great heads of cabbage, yellow pumpkins, and plenty of potatoes. Then there were jars of pickles and cans of tomatoes, and a store of popcorn for the merry evenings around the winter fireside.

Reliable seed houses, with attractive catalogues, from which seeds can be readily obtained, were not as numerous fifty years ago as now; so each year seeds were saved from this garden for the next year's planting. Seeds from the first large ripe tomato, the finest melon, the most perfect ear of corn, and a few of the earliest and best peas were selected. In that way the quality of the vegetables was

not only maintained but much improved; and something of the principle of selection—the first great principle of all plant improvement—was learned by the boy.

Perhaps, however, the most important lesson learned was that a plant makes stronger and better seeds when it can get pollen dust from another plant of the same kind than when it has to use that which grows in the same flower. He saw that the plants depended upon the wind and the insects to carry the pollen from flower to flower. A bee reaching far into a blossom to get the honey rubbed its back against the little pollen boxes. When it came out it carried away the precious yellow dust on its back and legs, ready to give it to the next flower.

He found that when the flower of a squash received pollen from a flower of a similar plant such as the pumpkin, instead of forming another perfect squash, the fruit which grew was not a finely flavored squash, but was somewhat tasteless like a pumpkin. This experience taught him the wisdom of planting such plants some distance apart, that their pollen might not mix, and thus the quality be impaired.

One does not become a great naturalist all at once. There is much to learn, and the knowledge must be acquired very slowly and patiently by careful study. All these facts about plants, and many more as wonderful, were learned by the boy Luther in the home vegetable

garden. He needed to know about flowers and pollen, for the time was to come when he would direct plants and they would obey.

CHAPTER IV

WHERE THE BROWN NUTS FALL

Luther's father, Samuel Walton Burbank, was engaged in the manufacture of brick, and owned not only his cultivated farm but also a large acreage of woodlands.

In these woodlands men were employed during the winter months felling trees and preparing wood which was used the following summer in burning great kilns of brick. Many times each winter, in the large wood sled drawn by Chub, the faithful family horse, the father visited the woodlands. He was often accompanied by his two little sons and their baby sister, all in warm coats, mufflers, and mittens, and snugly tucked in with a big buffalo robe.

Even before the open fields and pasture lands had been crossed, shouts of childish glee fell upon the father's ear, and perchance each boy was seen scudding the roadway holding to the back of the sled with one hand and in the other flourishing a ball of snow; while Trip, the pet dog, barked and frolicked as he joined in the winter's sport.

The way led across the ice-covered meadow brook, through the now leafless huckleberry and blueberry bushes, where so often during the summer pails had been filled

to the brim with sweet, plump berries; then up the gentle slope of Pine Hill the sled moved slowly on, cutting its way almost to the frozen ground, through fleecy flakes of snow, under the overlapping branches of oak and chestnut.

Again in springtime the children, with their father, visited the woodlands. The spruce and pine had early put on their new spring trimming tips of light green. The oaks and birches on the hillsides had awakened from their winter's sleep and were joyously waving their beautiful fringelike pollen blossoms in the breeze.

But the time ever to be remembered by these New England children was purple, hazy days of Indian summer, when autumn robed the trees with richest tints. Days when after the first frosts Chub was harnessed to the cart and with baskets in hand in which to gather the fallen chestnuts and hickory nuts the children climbed in beside the father, calling Trip to follow.

Occasionally a gentle breeze caused a shower of glistening nuts from the opening burrs, which were hailed with delight by the children. Trip ran to and fro, now and then halting at the foot of a tall tree to make known in his own expressive language the presence of a bushy-tailed squirrel among its branches. Then Chub, as if understanding it all, slackened his pace, and three happy children were soon seen scrambling among fallen leaves searching for the little brown nuts. Sometimes the burr itself with its three nuts snugly encased lay beneath the

rustling coverlet, and busy fingers were pricked by the protecting spines.

On these excursions the father told stories of plant and animal life, directing the children's attention, not only to flowers and trees, but also to the woodchuck in his burrow, to nests of birds, and to squirrels with their store of nuts and acorns in hollow trees.



Chestnut blossom.

Luther, the older boy, was ever anxious to learn more of Nature's ways. He carefully observed

bud and branch. The pollen blossoms of oak and chestnut were to him the pages of an open book; these he studied, and mused long on the lessons they taught. The slow growth of walnut and chestnut trees was noted. Watching the woodchoppers making axe handles from hickory wood, he saw that they chose the "pig walnut" because of its superior strength, although the "shagbark," the nuts of which were larger and better, was also valued for timber. He learned to distinguish the varieties of timber by the wood fibre, and habits of growth, as well as by the nuts. Thus the mind of the boy was storing knowledge that was to ripen into golden fruit in after years.

CHAPTER V

SCHOOL DAYS

School life for Luther Burbank began in the district school near his home. In a small brick building, nestling among pine trees, fifty or more boys and girls of varying ages and grades were under the charge of one teacher. With trees to climb, hills to coast, a pond near by for swimming in summer and for skating in winter, the hours of play were as full as the hours of study.

His first teacher in this school was an older brother, Herbert, who used to take the little fellow with him. Sometimes when the snow was too deep for little feet, after the mother had put on his coat, cap, and mittens, tied a warm scarf over his ears and kissed him good-bye, this brother would draw him to school on his hand sled. He was, at that time, too young for school life, and being a sensitive child, shrank from the fun and laughter of the older boys; but the sled ride was heartily enjoyed.

It happened that the next teacher in this school was his sister Jane; and, although she was very proud of Luther, she found it very difficult to induce him to recite the lessons, which she knew he had mastered perfectly.

Soon, however, he was at ease with his little school-mates, and with them blew the dandelion heads to "know if mother wants you," held the shining buttercups under



The little brick schoolhouse.

one another's chin to "see if you love butter," and whistled with blades of grass. He made pop guns from elderwood, whistles from willows, bows and arrows from beech and hazel, and toy canoes from the bark of the white birch. He knew the spruce trees in the swamp where the best chewing gum could be found. He knew the sweet birch and sassafras trees with spicy bark, the ferns and sweet-flags with edible roots; and in learning the uses of the various trees, plants, and herbs that grew near his home, he formed habits of observation which have proved of the greatest value in his life-work.

It was he, also, who led the little band of barefoot boys and rosy-cheeked girls where the sweetest strawberries hid in the meadow grasses, the biggest blueberries grew in

the woodland pasture, and where the finest hickory nuts and chestnuts might be sought among the rustling leaves. Thus, as he turned the leaves of the great book of Nature, over and over, the timid boy developed into a leader; and in this close intimacy and harmony with out-of-door life learned to read much of the finer and more delicate tracing of the hand of God.

“Knowledge never learned of schools,
Of the wild bee’s morning chase,
Of the wild-flower’s time and place,

.

Where the whitest lilies blow,
Where the freshest berries grow,
Where the groundnut trails its vine,
Where the woodgrape’s clusters shine;

.

For, eschewing books and tasks,
Nature answers all he asks;
Hand in hand with her he walks,
Face to face with her he talks,
Part and parcel of her joy,—
Blessings on thee, barefoot boy!”

WHITTIER.

At home he had the cows to drive to pasture, the chickens to feed, wood to bring, weeds to pull, and a thousand tasks so well known to a boy on a farm; for a wise father

kept him busy, yet he had time to build windmills, water wheels, and to repair broken sleds and skates. With the song of the robin and thrush to awaken him in the morning and a chorus of green-coated frogs to lull him to slumber at night, life was rich in the wealth of Nature's gifts to a country boy.

Through the meadow ran a rippling stream. There his bark canoes were floated, his water wheels placed, as he waded in its clear waters among the nodding heads of golden cowslips; and on its banks he gathered the cranberries reddening in the sunshine, questioning why those hiding in mossy places were of paler hue.

Sometimes with older brothers he strolled over Pine Hill for a swim in the smoothly flowing Nashua River, coming home with pockets filled with "shagbark" nuts; nor did he forget to gather from the rushes an armful of cat-tails to place with wild roses in the large living room. Then there was boating on the quiet wood-encircled Cumberry Pond. While the others fished, the boy gathered the buds of the beautiful white pond lilies resting on its surface, and which, opening the next morning, filled the rooms with their fragrance.

But always dearest to him were the autumn days, when trees and vines were robed in russet, scarlet, and gold; and when the flowers began, one by one, to close their eyes, making ready to lie down to sleep beneath a coverlet of snow.



The Nashua River, Lancaster, Mass.

One of his first treasures purchased with his own earnings was a good microscope, with which he studied the tiny mosses and lichens on the old stone walls, and which revealed to him some of the beauty of the flower hidden to the unaided eye.

He early formed a taste for reading, for the home was well supplied with books. The weekly visits of the *Youth's Companion* (then a much smaller paper than now) were welcomed by him, as by so many boys and girls since

that time. The town of Lancaster had an excellent public library, and no one appreciated it more than did Luther. He read books of natural science, entering eagerly into the study of each. For a time geology and the study of rocks occupied all his leisure moments. A slate quarry near by, the clay banks with vari-colored strata,* and the great granite boulders of Rollstone Hill were examined with care.

Books descriptive of plant life were read and re-read, ever with the desire to know more of the life and habits of the plant companions. A cousin, who was a student of science and a personal friend of the great Agassiz, became interested in the questioning young mind, and although several years older than the lad, the two became fast friends.

Chemistry and physics, each in turn, held his thought, while he experimented with an old teakettle in the back yard, making steam whistles and toy engines. A study of the heavenly bodies and evenings with the stars followed. Falling meteors (shooting stars), the milky way—that broad bright path in the sky supposed to be the light of countless stars—and the aurora borealis, or northern lights, which appeared like a brilliant electric arch in the night sky, all were of the most intense interest to him. He excelled in free-hand drawing and in painting in oil colors, for into each study he threw his whole soul, and

* Beds or layers of rock.

whether work or play occupied his attention, he had the habit of putting all his energy into one thing at a time.

When fifteen years of age Luther entered Lancaster Academy, becoming a general favorite with teachers and classmates; and there he studied several winters. Each day he walked to the academy, which was three miles from his home, often retracing his steps in the evening to enjoy an hour's practice in the gymnasium, as he was extremely fond of athletics.

The summer months were spent in the city of Worcester, learning the mechanic's trade. He was faithful in the work in the great noisy plow shops, even excelling in it, yet letters written at that time to the loved ones at home speak more of the beauty of the earth and sky, of the music of the birds and frogs, than of city life and the sound of machinery.

After leaving the academy, for a time Luther studied medicine and hygiene. This, as well as the other sciences, he endeavored to put into practice, and by so doing, no doubt, built up and strengthened a naturally frail body.

Notwithstanding all these interests, the message to the plant world must be given, and at the age of twenty-one he had begun his great life-work, the training of plants to greater usefulness and beauty.

PART II—THE MAN

LUTHER BURBANK

“He took a little jostled wayside weed—
His intuition keen without a peer—
And read each wound and every weakness clear;
Then struck his finger gently on the seed,
And touched the slender starving wind-blown reed,
And to it said, ‘Thou ailest here and here,
Thou needest only food and loving cheer
To gladden any garden, glen or mead.’
He walked with Patience many a tedious hour,
With Genius’ glowing lamp aflame in hand;
Or sat with her in Wisdom’s citadel,
And heard the watchman calling, ‘All is well’;
Then saw the shrunken, blighted bloom expand
Into a graceful, snowy, starry flower.”

MARY BELLE WILLIAMS.

CHAPTER VI

THE NEW POTATO

While Luther Burbank was yet a young man in New England he purchased land and devoted a few years to market gardening. In this garden there was a plot of Early Rose potatoes, which, as is the habit of this variety, seldom bore fruit from the blossom, as did most other kinds of potatoes at that time. Most grown folks now, who were children then, remember that this fruit was

called the potato ball, and many were the children who picked the fruits and played with them.

In the summer of 1871 as the young man was walking through his garden one morning, he saw among the leaves of one of the potato plants a seed ball. He had early formed the habit of close observation, else he would have passed this by unnoticed, for it was the only fruit on the whole acre of potatoes.

He had known from childhood that when seeds are planted, either from the potato or almost any of our best orchard fruits, one is likely to get a better or poorer variety than that planted; for seeds from these plants seldom come true.

He determined to save this lone fruit and plant the seeds, hoping he might succeed in raising a new and better kind of potato, so he watched with impatient eye its ripening. But when the vine turned brown and the fruit was almost ready to break from the mother plant, he missed this treasure. He searched day after day, and when he had almost given up the seed as lost, he found it some distance from the vine. It had probably been broken off by a dog running through the patch.

This seed ball contained just twenty-six seeds so small that ten of them were not as large as an ordinary pin-head. Burbank carefully saved them until the following spring. He planted them, but had to wait through the long summer months for the vines to grow and the tubers to form.

When they peeped through the soil there were just twenty-three young potato plants. They were often visited, and accurate observations regarding rapidity of growth, height and size of stalk, shade of color, shape and number of leaves, etc., were made. Each plant was carefully labelled and numbered.

When it was time to dig the potatoes he found a few tubers in each hill. They were of different sizes, colors, and shapes. Some were about the size of a hen's egg, others as large as an ordinary potato. The potatoes in hills numbered fifteen and seventeen were much better than the rest. The tubers of number fifteen were the largest, of uniform size, and were pure white, and together weighed three and one-fourth pounds. There were twenty-three new varieties, but only seven of these were saved for future planting; all the others have been lost to cultivation. Some of these, by further trial, might have produced potatoes of importance. One that was discarded was bright red, one was pink, another pink with white eyebrows, while in another the eyes reached nearly to the centre of the potato. To-day the master would save all for further training.

An agricultural fair was held in the neighborhood, and Burbank decided to exhibit his products. A long table was reserved on which he placed some of the finest beets, carrots, cabbages, pumpkins, squashes, tomatoes, and watermelons that had been produced in the Bay State,

and the tall stalks of corn bearing great ears and towering above the table were far better than those raised by the Pilgrim fathers under the direction of Massasoit.

The mother, from whom Burbank inherited much of his love for Nature, brought bouquets of beautiful flowers and placed them on the table among the vegetables. Glasses of transparent jellies, jellies of crystal white and ruby red, also jams of various kinds from the mother's winter store, were arranged in pyramids among the gardener's displays. But the exhibit that most attracted the curious as well as the scientific observer was seven plates, each containing the product of one of the seedling potato plants that Burbank had so carefully tended.

One of the greatest seedsmen of the United States was invited to visit the fair and to deliver the opening address. In the course of his remarks he referred to the seven plates of seedling potatoes and to the possibility of their development, predicting a brilliant future for the producer.

At the close of the programme Burbank was introduced to this man of note. The seedsman inquired how he produced the potatoes, and offered to buy number fifteen if, after further trial, it proved as good as it then promised.

Cultivation for testing and to increase the stock continued until the fall of 1875, when Burbank sent to the seedsman the potatoes he had raised from number fifteen, and received for his new product \$150. The seedsman

christened the new potato "Burbank" in honor of the originator, and kindly allowed the young man to keep ten of the tubers.

Burbank did not get rich from the sale of his potato, but let us see what the habit of observation and the dili-



Burbank potatoes.

gence of one young man has meant to the world. From one tiny seed that young Burbank planted in the spring of 1872 the "Burbank" potato came. More than five hundred million bushels of this potato have been raised during the past forty years; enough to make one million six hundred and sixty thousand car loads, which would make up a solid train of potatoes to reach more than half around this planet. A gentleman connected with the United States Department of Agriculture at Washington, D. C., many years ago made the following statement:

"The Burbank potato has added to the productivity of the country \$17,000,000, and some one has calculated

that if all the Burbank potatoes raised in one year were placed in a row, end to end, touching one another, the line would be long enough to make three rows of potatoes from the earth to the moon."

After selling his potato, Burbank decided to leave his home in New England and seek a climate more favorable to the work he most enjoyed—plant experimentation. With the \$150 received from his potato he purchased a ticket for the Golden State and brought with him the ten new potatoes for trial in the West.

He engaged in the nursery business for a few years, but through these years he did not forget the precious seed ball nor its descendants; indeed by this time people over the greater part of the United States were eating Burbank potatoes and the name "Burbank" was becoming a household word in other lands.

It was early discovered that this potato would withstand the blight better than other kinds, and as this disease had been at various times prevalent in Ireland since the great famine in 1846, this variety of potato was hailed with delight in the Emerald Isle; for the potato is one of the principal foods of the Irish peasants.

The people of Massachusetts in the neighborhood of the market garden of so long ago are now preparing to erect a monument to the Burbank of Science on the spot where originated the potato that has so largely increased the food supply of the world.

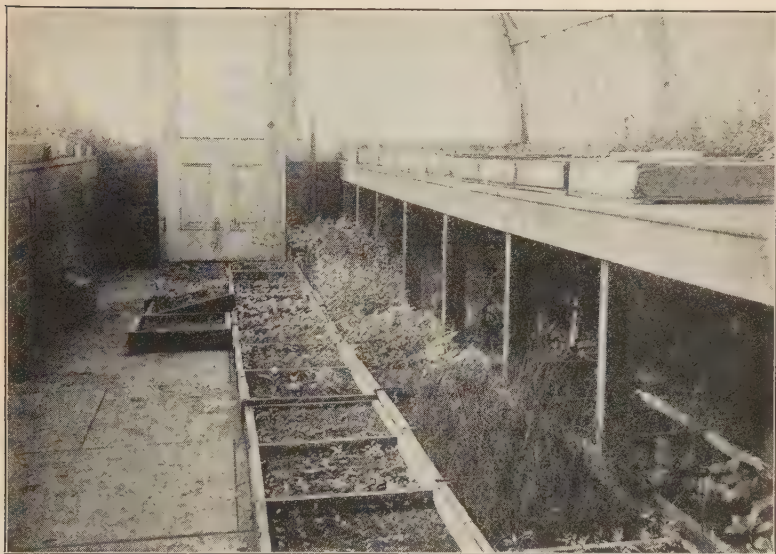


The vine-covered cottage in Santa Rosa.

CHAPTER VII

THE HOME IN CALIFORNIA

Here is the vine-covered cottage in Santa Rosa where for many years the mother who gave the master his first lessons in plant culture lived with him, while her hair became white and her steps slower as she neared the land where flowers never fade. Over the cottage gently sway the graceful boughs of an elm tree brought by Burbank



Baby plants.

many years ago from the Massachusetts home; and near it among rare trees and shrubs from foreign lands grows a beautiful white birch, also from the childhood home.

Near the house is a conservatory where the seeds are sown in boxes, and the baby plants break through the carefully prepared soil to meet the light of day, sometimes many thousands in one box. Often, as one enters, a little brown tree toad jumps upon the door knob and awaits recognition. The very valuable work of toads in destroying insects is understood, and this is an especial pet. Its tiny beadlike eyes note every movement, and the little



Conservatory at the old home of Luther Burbank.

fellow jumps upon Burbank's hand and curls down to be softly stroked by him.

When a few weeks old the little plants are given more room by transplanting into other boxes; later these boxes are placed outside and protected by large wooden frames, until the plants become hardened so that they are able to withstand sun and wind, then they are set in beds, where the soil has been made ready for them.

Not far from the conservatory are the packing sheds, where trees, plants, and bulbs are made ready for shipment, and are started, often on very long journeys, in exchange for other seeds and plants.

The grounds, consisting of eight acres, are under the most intense cultivation. Here, no doubt, are growing more new, rare, and curious plants than elsewhere, in the same space, on the globe. The enclosing fence is so low that passers-by may see and enjoy the beauty of the flowers without entering and thus interrupting the work. Entering at the gate one meets bright, happy flowers on every side. Narrow paths separate the beds of growing plants, which are arranged, not like a park for the enjoyment of visitors, but like a workshop; for here, to those who understand, the real skill of a master hand is most in evidence.

The little pollen-carriers, the humming birds, the bees and butterflies, revel in this wonderful garden; and sometimes become bewildered when some strange flower from a distant land first opens. Its form and color being unfamiliar, they do not know just how to approach and extract its sweetness.

CHAPTER VIII

JUMBO

One time Burbank brought home a tiny, cunning Japanese dog, which he named Jumbo. The little dog cost almost his weight in silver, but never during the thirteen years of Jumbo's happy life would the master have parted with him for his weight in gold.

Jumbo, like his namesake, the big elephant, was very wise, and when his master said, "Be careful never to step on the flowers or dig them up," his beautiful large eyes shone with intelligence. He understood every word, and



Japanese spaniel.

was not known to disobey. He learned to love the same things his master loved, and walks with him in the garden were Jumbo's delight, although he chose other places for his frolics. He really seemed to know and admire the plants. He knew always when a plant was removed and another took its place. He appeared, too, to know by instinct just where the master was going, running on ahead, and waiting at the particular plant or tree upon which the great gardener's attention was at the time directed.

The greatest joy of Jumbo's life was, however, the day

that Burbank spent twice each week at the Gold Ridge farm, near Sebastopol, about eight miles from his home. The evening before the master would say: "Jumbo, you must get up early to-morrow morning, and eat a good breakfast—we are going to Sebastopol."

Now Jumbo was an aristocratic dog, and usually stayed in his warm bed until breakfast was announced, but on these mornings he was up early, and so eager was he to be off that he very impatiently waited for the family to breakfast first; and when given his own was almost too impatient to eat. When his master would say, "Yes, Jumbo, eat a good breakfast, so you can go with me," his efforts to eat quietly were really amusing.

Then in his own language Jumbo would ask to have his coat strapped about him, for the little body was very sensitive to the cold of the early morning. With barks of joy he ran to the gate, and was placed in the wagon on the seat beside his master. How proud he felt, barking at the big dogs they met on the road, no doubt thinking that he was the biggest of all!

Arriving at the farm, he followed his master in the warm sunshine all the morning hours up and down the long rows of beautiful flowers. He lingered in the shade of the trees, becoming acquainted and making friends with every growing plant, and all the time ants, bugs, and toads were also receiving their share of attention from him. It was hard work following the master; so, after

lunch he was usually contented to take a nap, lying quietly beside his master's coat until he saw Black Belle harnessed, and a tired but happy dog knew it was time to return to Santa Rosa.

Jumbo's bed was a small box with an opening in one side as well as at the top. When it was bedtime he would jump into the box and wait for his master's "good night." Then, kissing his hand, Jumbo would curl down and have his blanket placed over him. He did not crawl out from under the cover until morning, but sometimes a little brown nose might be seen at the opening in the side of the box.

One day soon after he came to the Burbank home Jumbo stood watching Tortoise, the cat—an older and larger member of the household—eating from a small dish. Evidently he had noticed that Tortoise had always the same dish, and that he was not allowed to eat from it. Probably he did not understand that his tongue lapped up the milk so fast that the cat, with her daintier way of eating, would have had little chance to get her breakfast had he been allowed to eat from the same plate.

Jumbo stood still for some time, an act which was quite unusual for such a lively little animal, as if trying to solve a hard problem. Suddenly he ran out into the field where some soil was being prepared for use in planting. Among the ashes brought from town were some broken and discarded dishes. Jumbo carefully dug the

ashes over, and from the rubbish selected a small plate. With his delicate little paws he pushed it aside, and after much hard work succeeded in bringing it in his mouth to the house.

Placing it beside the cat's dish he looked around with a satisfied expression, as if to say, "I, too, now have a dish of my own." That was ever after Jumbo's own personal dinner plate, and he did not allow the cat to even look at it.

Jumbo was a very fastidious little fellow. Once an ant ventured to climb up over the edge of his plate toward the food. Jumbo stepped back, gave two or three sharp barks, then, with a look of disgust, walked away, leaving his dinner untouched.

When Burbank came in at night, tired from a long day's work preparing the soil or caring for the plants, he would say: "Now, Jumbo, you must make me laugh." Then the dog would stand perfectly still, drop his long soft ears, shut his eyes, and would not move until he thought of something to do. Suddenly he would become a clown, always with a new trick. Sometimes in walking across the room he would in the most awkward manner stub his nose on the carpet and tumble down, looking so surprised that no one could doubt that he understood the joke. At another time his repeated and unsuccessful attempts to jump upon a chair or the lounge (a very easy task for him) would win the applause he anticipated.

Again, he would take fright at a fly, or some imaginary object, pretending it was a great monster striking terror to his very being, then suddenly look around, as if to say, "Did I fool you?" He never failed to produce the laugh and receive the applause of his audience, whether it consisted of his master alone or of other friends.

Because no member of the household ever deceived him, Jumbo believed just what was told him. He made friends readily, and was quite fond of his master's bookkeeper, who highly prized the little dog's friendship. Unfortunately, one morning the bookkeeper thought to play a joke on Jumbo. He told him to watch at the window for an absent member of the family, saying that she would return that day. Poor little Jumbo believed him, and watched patiently all day at the window. When the shades were drawn in the evening he actually cried, feeling no doubt that he was the victim of an unkind joke. Never afterward would Jumbo pay the least attention to the bookkeeper, except to look reproachfully at him, as if to say, "You are no longer my friend."

The one great sorrow came into Jumbo's life when Burbank decided to visit his friends and old home in Massachusetts. Jumbo seemed to understand all the preparations made for the journey, closely following his master's steps for several days before his departure, in every way showing unusual affection for him. Burbank patiently endeavored to make him understand that he

would return in a few weeks, and that the best of care would be given to his little pet while he was away. Jumbo could not be reconciled, and after his master left refused to eat. Everything possible was done to comfort him. Something of his master's—a coat, a shoe, or hat—was given him each day, beside which he would lie and moan.

Very touching were the efforts he made to swallow a few bits of food, when told he must eat; but day after day he became thinner, until a letter was sent to Massachusetts, telling the master to return at once, or the little dog would not live.

And when Burbank came Jumbo almost died of joy. Although he had been told of his master's coming, the shock was almost more than the little wasted frame could bear; but he was carefully nursed, and in a short time he was again the happy little Jumbo, with his usual good, dog appetite.

After a while Jumbo's days were numbered and he closed his eyes. Very tenderly was the little body wrapped in his blanket and placed in the earth in the shade of a beautiful palm tree near the master's home.



Luther Burbank's present home.

CHAPTER IX

THE NEW HOME

Beautiful vines climb over the Burbank home in the "City of Roses." It is a large square house, somewhat resembling his childhood home. Around it the flowers bloom, and trees and shrubs grow with so much of their native air and grace that it has become a favorite haunt of the birds. Even the shy quail run across the lawn, and,



Children from a public school at Luther Burbank's home on Burbank Day (Arbor Day in California).

unmolested, rear their little ones in the quiet shade. A narrow, winding footpath under the trees leads to the Santa Rosa creek, whose banks are lined with trees and vines. Among these every morning the wood thrush sings with the same sweet, clear, bell-like tones that charmed Burbank when a boy in his New England home.

No less lovely than the plants surrounding the home are the eager, happy faces of the school children as they peep through the fence at the master and his flowers. That

the boys and girls know and appreciate his love for trees and birds is shown by the following pledge, signed by the four hundred children of one of the Santa Rosa schools, and presented to him on his sixty-second birthday:

“To-day, as a part of our Arbor Day exercises and in honor of one, who is, we know, a sincere friend of birds and trees, we pledge ourselves to befriend all of God’s creatures, to protect the birds, and not to maliciously destroy trees or any of the other beauties of Nature.”

PART III—THE SCHOOL

“Who kneels to learn the lily’s shining creed
Grows like the lilies, liker Christ indeed,
Thou, of all these, whom God has set apart,
High priest of nature in the shrine of art,
Thine are the secrets of the inner shrine:
To lift the veil from Nature’s face to thine;
To speak with reverent awe the magic spell
That bids the wonder be a miracle;
To break the tyrant chains of red and blue
That binds the flower to its ancestral hue;
To bid the royal purple to unfold;
Upon the native pansy’s gown of gold,
To touch her velvet robes and bid them be
All colors that the rainbow held in fee,
These are the highest, holiest deeds of man,
Completing what the soul of God began,
A gracious gift that from a golden store
Enriches beauty grown from more to more.”

SAMUEL J. ALEXANDER.

CHAPTER X

THE PLANT SCHOOL

Many, many thousands of plant pupils are each year enrolled in the Burbank plant school at Santa Rosa, California. They are not there to produce fruit, nuts, and vegetables for food, or flowers for beauty alone, but to be developed, educated, trained, and thus to gain new habits

and qualities that they may be of greater worth to the world.

Pupils come from every land seeking admission, many of them having very interesting histories. Some are from the gardens of the King of Italy, others from the royal gardens of Japan, and some have been sent from far-away Siberia and India. There are pupils from Australia and New Zealand, from Alaska and Patagonia, from Europe and South America.

To secure rare and strange plants men have climbed mountain precipices, forded overflowing streams, and crossed barren plains, many times meeting discomfort and danger in the work. Always, however, the trees and plants of our own land form the largest groups. Not only are those which are commonly cultivated given a place, but often a despised or neglected weed has become a prize pupil in the school.

Not always because of apparent good qualities do plants obtain a place. Some have hidden properties of great value; others are simply lazy members of a good family, and, by patient care, may be corrected and reformed, so as to become useful citizens of the plant kingdom. Still others are chosen because, under the direction of the master, they are likely to form new habits and characters.

Luther Burbank, the teacher, sees wonderful possibilities in plant life; but he knows that each desired shade and tint, form and grace, perfume and flavor, must be devel-

oped in the character of a plant by slow and repeated effort just as a child is trained and directed year after year by loving parents and teachers. He works patiently, and when the least sign of improvement is seen, continues his work with the plant; otherwise it must be rejected and the place given to another. As plants are not so easy to teach as children, in this school ten thousand in one class may fail and only one meet the requirements. Yet the work goes on, for, like the master, plants seem never to become disheartened. Usually from six to eight years are required to complete the education of a pupil, but some have remained in the school for thirty or more years.

The Gold Ridge proving-grounds, where the more extensive work is done, are eight miles west of Santa Rosa, near Sebastopol. On an eastern sloping hillside sixteen acres are devoted to the growing trees and plants. Just inside the enclosure is the pretty cottage occupied by the superintendent of the grounds, and in which has been furnished an office and rest room.

The view from the place is very picturesque, overlooking the beautiful Santa Rosa valley, with its wooded hills and low mountains as a background, and Mount St. Helena in the far distance.

Narrowing bands of deepest crimson, delicate pink, and many other shades and tints extend from the entrance up and over the hillside. These magnificent flowers are the new gladioli.* Wonderful new Shasta daisies glisten

* See illustration on page 82.

in the sunlight like banks of snow, and scores of other flowering plants form lines of exquisite beauty.

The location of each variety is shown by a small, neatly



View of one corner of the Sebastopol grounds.

painted stake; and all are arranged with reference to their needs in regard to soil, moisture, cultivation, and test, rather than for artistic effect.

Berry and other vines, and many kinds of native and foreign shrubs, are also growing in long rows, marked by similar wooden stakes. So familiar is the master with his

pupils that were all these stakes removed he would at once recognize each. But that all the work be scientifically accurate, plan books are also kept, having plots and maps showing the exact location of each class, and giving its record.

Farther back are fruit trees, together with nut, timber, and ornamental trees. Whether robed in simple green, bright with pink and white blossoms, rich with many colored fruits, dull with the russet of autumn, or with their bare branches reaching upward, the trees are always beautiful. Native and foreign trees seem to form close friendships. The trees from the southern hemisphere often experience considerable difficulty in adjusting themselves to the new conditions. It was very amusing to watch some apple trees sent from South America. The first fall they were in California they put out tender green leaves and opened pink and white blossoms just as the other trees were preparing for the winter's rest. They seemed conscious of having made a blunder, and soon dropped these signs of springtime, yet were confused; and it was two or three years before they learned the proper time to array themselves in the beautiful garment of spring.

Birds build nests, chatter and sing in the trees, feasting upon fruit, nuts, berries, and seeds so abundant here; no doubt earning an honest living, as they destroy many injurious insects. Yes, little birdies, you know the earli-

est and sweetest cherries, and are quite welcome to your share. But why persist in the wasteful habit of taking only a bite from each one, and spoiling so many that the master is compelled to protect any especially choice fruit by covering the tree with netting?

Here is a ripening seed pod, very precious; for it the master has waited years; along comes an inquisitive little bird, who wishes to try the flavor of those very seeds. Ah, ha, little bird, your habits are known, and a paper bag has been snugly tied over the seed pod. Sometimes an enterprising squirrel or rabbit comes in from a neighboring field for a meal of nuts or vegetables. The most unwelcome guests, however, are the little brown gophers. More than once have they destroyed priceless bulbs, which could not be replaced. Yet no enmity is felt by the master toward them, for upon roots and bulbs must they depend for their food.

The young trees and those plants which require a long time for testing are brought from the Santa Rosa experiment grounds, as much of the work begun there is completed here. Many workmen are constantly busy preparing and cultivating the soil, planting, trimming and training plants, seeing that sufficient food and water are provided, and that each plant is kept healthy.

Although only reliable men are employed, yet each plant has Burbank's personal attention, as he alone is able to recognize the slight differences in growth or habit.

Passing by a class, he often stops to tie a little white string around the stem of a plant in which a certain quality has attracted his notice, and with which he wishes to become



The "O. K." mark.

better acquainted. Or, perhaps, he places on a stake or a label a double cross (#). This is his "O. K." mark, and whether upon a new fruit, an important manuscript, or a piece of pie, which pleases his taste, it signifies work well done.

At the testing season, during the long summer days,

Burbank spends much time at Gold Ridge. As each fruit under test ripens, photographs are taken, and a complete record is made and compared with that of previous years. The size, shape, quality, flavor, color, general appearance, keeping quality, hardiness, amount of fruit to the tree, and many other points are noted. Each year many badges of honor are awarded, and each year some new fruits and flowers are graduated. Many more are kept for further education and training, while some must be rejected.

Some of the pupils when they enter the school have only family names, but as they assume new forms of beauty, or of usefulness, they receive an added name—a baptismal name, retaining, of course, their original family name. And just as they have come from all parts of the world, so in their new and improved forms they go back to distant lands. So widely have these fruits and flowers been distributed that it is true that, "The sun never sets on the Burbank productions."



How new plants are made.

CHAPTER XI

HOW NEW PLANTS ARE MADE

It is a good thing to make friends with Mother Nature and learn to know her trees and flowers well. They all have messages of love and cheer; then, too, we have so many things for which to thank the plant people—food, clothing, shelter, cooling shade, and many more. And they are delightful companions. Books are the best of indoor friends, and trees and plants the best of outdoor friends.

Luther Burbank has learned to appreciate all this, for he says: "What occupation could be more delightful than adopting the most promising individual from among a race of neglected orphan weeds, downtrodden and despised by all, and lifting it up by breeding and education to a higher place? To see it gradually change its sprawling habits, its coarse, ill-smelling foliage, its insignificant blossoms of a dull color, to an upright plant with handsome, glossy, fragrant leaves, and blossoms of every hue, and with a fragrance as pure and lasting as could be desired?"

Try to put yourself in the place of a plant. Perhaps it is wild and would be made tame; or it has an unpleasant odor and desires a sweet fragrance. It may have an unattractive flower which it wishes bright and beautiful. If a fruit, it is sour and may wish to be made sweet. It might be a berry full of hard seeds that hurt its feelings and it would like them removed; or a nut that would be useful but for its puckery bitterness. Burbank has changed all of these things, and many more. He says: "I have no magic or secrets to impart. I simply learn and follow Nature's laws."

New plants are produced by selecting or choosing, year after year, the one plant among many of its kind which has an especial quality that you desire, and saving the seeds from this one plant only, instead of planting seeds from every one. In this way by selection alone you can

make the blooms larger, change their color, lengthen or shorten the stem, and make many other changes. Did you ever see a bleeding heart that was not a pink red? Probably not, but Burbank has produced one that is white.

This changing process can sometimes be greatly hastened by crossing two plants which are closely related but have different qualities, unlike in size or color. To understand what is meant by crossing, you must understand something about the parts of a flower and the uses of these parts. Every complete flower has sepals, petals, stamens, and a pistil, and several pollen-bearing anthers.



White bleeding heart.

Each outer leaf is called a sepal. Sepals are more commonly green or greenish, but not always.

Each inner leaf is called a petal. Petals are usually of some other color than green, and form the showy part of the flower.

The stamen bears on its stalk a little powder box filled

with precious golden dust. The tiny case is called the anther and the golden dust is the pollen. Here is an anther discharging its pollen.

At the tip of the pistil is the stigma upon which the pollen falls. The pistil thinks itself the most important part of the flower, for the stamen furnishes pollen to help



Flower of a common weed.



Two parts of each kind of the same flower, enlarged.



Stamen.

- A—Sepals.
- B—Petals.
- C—Stamen and anthæ.
- D—Pistil and stigma.



Pistil.

it make the seeds and the sepals and petals form coverings to protect it. No plant can produce seed unless pollen falls upon its stigma. It seldom happens that the pollen of a blossom fertilizes its own seed. Nature has many pollen-carriers—the bees, the wind, and many more—to bring the golden dust from other flowers, when the flower is ready to receive it. The pollen is what gives life to the seed.

If you should plant white corn near a field of yellow corn, many ears would be found to have both yellow and

white kernels, for the wind has carried pollen from the yellow corn tassel to that of the white corn, and so the seeds become crossed or mixed. This crossing is continually going on everywhere in Nature, and thus each plant has an individuality, no two being exactly alike. Although to most persons all buttercups or daisies look alike, they differ in many ways. There is an endless variety in flowers as there is in human faces.

Usually when we speak of crossing, we refer to the work of man in combining two plants. An apple blossom will illustrate how this crossing is done. The only tools you will need are a good microscope, a tiny saucer to hold the pollen, and a small, sharp knife. Some morning when the flowers are about to open, gather the anthers of several blossoms from one tree and place them upon your saucer to dry. The pollen will soon shake out. The blossoms of the other tree to which you wish to carry the gathered pollen must not be open or in full bloom, lest some pollen-carrier has been there first. Carefully cut away the petals and anthers, leaving the pistil uninjured. Then dip the tip of your finger into the pollen in your saucer and place it gently upon the stigma of the flower, which you have prepared to receive it. It will hold the yellow dust fast. There is nothing now left to attract a pollen-carrier to the fertilized blossom, for its bright petals are gone, and there is no footing left for an insect to light upon. It would be well to place a tag upon this bloom so that you can watch

it closely, and carefully save the seeds when they ripen. These seeds will be a combination of the two varieties crossed. Plants from them will, no doubt, vary greatly, giving an opportunity for selection of the best from the seedlings.

This process of selection of the best plants should be carried on faithfully for several years in order to fix any quality in either fruit or flowers. Some of the seedlings may be better than either parent, or they may be valueless. One of the main objects of crossing is to produce this variation, from which selections may be made.

The work of plant improvement is beyond comparison with any other chosen occupation, owing to the delight it gives one and the happiness it adds to the human race.

CHAPTER XII

THE SHASTA DAISY

The little wild field daisy, that grew around Luther Burbank's childhood home, was considered by the farmers an evil thing, a harmful weed. Burbank's loving heart seemed to go out to this little forsaken thing, which, to most persons, was an intruder, not deserving even a place to live. He singled it out from the attractive flowers, that appealed to every one—the violet, the aster, the pansy, the trailing arbutus, the lily, the rose—not for lack of love for these, but they had friends a-plenty, the daisy

scarcely one. He would show it friendship, and give it a chance in the world to be something.

It was like taking a little neglected orphan child, who had never been rocked in a fond mother's arms, or kissed to make it well. He would teach it new ways of which it had never known. He would give it love and make it a queen among its kind—this little waif.

So Luther Burbank took his little childhood friend, the moon-penny daisy, from its home within sound of the Atlantic's roar, and placed it in his plant school on the Pacific coast, among his rare and most choice flowers. Though his every hour was crowded with work, he made time to plan a glorious future for it, and his interest in it held throughout the years of patient attention he gave to its education.

In England there grew a daisy similar, but somewhat larger in size, whose coarseness excluded it from the royal flowers. And over in Japan still another, quite small, but dazzling in pure whiteness. Neither of these, however, was as hardy as their American cousin nor as productive of bloom. But in the three Burbank saw an outcome most wonderful.

The three little daisy cousins were brought together in the plant school, and their education began. The American daisy furnished a strong constitution; the English daisy gave size; while the Japanese daisy contributed purity. These, when united, would give strength, beauty, and importance.

Soon they blossomed, nodding and beckoning to each other, and growing to know each other as neighbor children do. Then Burbank visited them, and called upon them



Two Shasta daisies.

for some of their golden pollen. First, he took it from the English daisy and, carrying it upon his watch crystal, gave it to the American daisy. He then waited until the seeds from the two united flowers ripened, which were only a few in number. These he treasured carefully until the time to plant them. He then bade farewell to these two little pupils, the English and the moon-penny daisy, for their life-work was done.

He came again when the little plant children from these few seeds were dressed in their white gowns. This time the Japanese daisy gave her golden pollen, and he carried it to the new seedling pupils. Then the Japanese daisy passed, for her work was done, also. Again he must wait

for the new pupils to ripen their seeds, and still longer, until they were planted, grew up, and were white with bloom.

Then with loving eyes he viewed the daisy class, and chose those which gave promise of the qualities; strength, size, and whiteness, combined with grace of form and profusion of flowers. The others must all give way for their growth. The seeds from the best of these were gathered, and the next season the finest plant pupils were selected from the number.

This training went on for several years, until a hundred thousand seeds were saved and planted in a space about ten feet square. When large enough, they were transported to the Gold Ridge grounds, where they were given about an acre to insure plenty of room for further development.

All these years Luther Burbank protected his little pupils from worms, gophers, and plant lice, giving them the tender care of his own hands—not trusting it to others, whose sympathy might be less than his—for it is a known fact that love calls out response in the growth of plant life as it does the best there is in human life. So love rules in the plant world as it does in our own world.

When the hundred thousand plants were started another important step in the upward life of the daisy was reached. For six months they blossomed. Twice a week the teacher examined bloom, stem, and leaf of each plant. One would

have a wonderful blossom on a scrubby stem, one a graceful long stem, but its flower would not be perfect in whiteness; another would have strength and grace but lack beauty. Out of this large number only those that came nearest Burbank's ideal were allowed to live and bear seeds.

For eight years he patiently worked with his daisy. Sometimes a blossom would measure two feet in circumference, seven inches from tip to tip of petal. But this was not selected. It would not stand in every climate and grow under every condition. It lacked sturdiness of petal and would not be able to withstand the bright sun and the storms. He wanted a daisy that would gladden the heart of a flower lover in Alaska the same as it could in Florida, Norway, or Italy—one that would flourish in all soils and all climates.

So from the medium-sized daisies pupils were grown and regrown, the flowers being from three to six inches in diameter, for sturdy plants only would be hardy and give good keeping quality to cut flowers.

We have from these years of patient toil and constant care a daisy that will thrive north of the arctic circle or under the equator, and will give, on long graceful stems, in abundance, flowers of snowy whiteness, from three to six inches in diameter, with a large golden centre, and when cut, will remain fresh from ten days to two weeks.

This beautiful flower Burbank named the Shasta daisy,



THE SHASTA DAISY

from the snow-capped peak of northern California, Shasta, meaning white, or whiteness.

One of the peculiar habits of this wonderful new daisy is, that, unlike its ancestors, it never seeds itself, producing only a few large seeds; therefore it never has, and never will, become the pest that it was in the wild. A self-sown daisy has never been found in the plant school. The master's work there is not only to teach good qualities but to expel bad ones. The daisy was induced to drop her one bad habit of spreading.

To this stately daisy Burbank has added a double daisy, by selection alone; choosing each year those that show a tendency to become double. The petals crowded closer and closer together as the selections were made each year, until a pure white, perfectly formed blossom was obtained; a more than rival of the chrysanthemum, as the daisy blooms from five to seven months in the year. Three strains of this daisy were perfected—the Alaska, the California, and the Westralia. Another, newer still, is a beautiful fringed daisy, far finer even than any of the others.



Miss Eschscholtzia.

CHAPTER XIII

MISS ESCHSCHOLTZIA* HAS A NEW DRESS

Luther Burbank stood in the open near his home one bright spring morning admiring the beauties of Nature around him. There were wild flowers everywhere—delicate nestling baby blue-eyes, fragrant white forget-me-nots, purple larkspurs, snowy meadow foam, all woven and interwoven into one great rug. The upland ran one sea of gold—California poppies, lifting their shining yellow cups

* ě-shōlt'sī-ă.

to the sun, smiled upon him. He stooped to examine some of the golden petals near his feet, saying:

"This beautiful dress of bright golden hue which you have worn so long is very becoming to you and exceedingly appropriate to this land of perpetual sunshine. But, Miss Golden Cup, if you would sometimes wear a dress of white, pale cream, pink, or crimson, we would love you still better than we do."

Suddenly his practised eye caught a crimson hairlike ray on one golden petal, as if Mother Nature had made a mistake in using her crimson dye. He immediately resolved to form a poppy class in the plant school. He protected this plant from danger and shielded it until the seeds ripened. He knew that he must be watchful if he would get the seeds, so he placed a paper bag over the ripening pod.

All the *Eschscholtzia* family have taught their pods to pop suddenly open when thoroughly ripe, thus scattering the seeds so that the young plants may have more room and fertile soil for homes. When the seed pod bursts it makes a loud noise, and the California children say, "Miss Poppy is firing her pistol."

The *Eschscholtzia* is intensely bitter, therefore has few foes to war upon it. It is said to be more avoided by slugs than any other plant.

The seeds from the poppy with crimson ray were sown in the plant school. Soon young *Eschscholtzia* pupils

peeped through the soil. Leaves and buds appeared, which were soon followed by the golden flower cups.

Little Miss *Eschscholtzia* is a quaint maiden who wears a queer green pointed cap like a brownie's toboggan. This is trimmed with a delicate frill which has a rose-colored edge. She doffs this cap before making her bow to the world, then spreads out her yellow satin gown and dances in the sunshine. She is not only quaint but wise as well, for when the fog blows in, or the rain approaches, she folds her garments tightly about her, lest her beautiful sheen be spoiled or her golden dust injured.

These little *Eschscholtzia* maidens were being taught to change the color of their gowns, so when examination day came the master put white ties around the stem, close up to the blossom of those who seemed to be trying to obey his instructions.

How proud these plant pupils surely felt as they stood erect with snowy ties around their little necks. They had seen this reward of merit given to other plants—only yesterday to a class belonging to the lily family—but never before had such a prize been awarded to one of their kind.

The workmen knew when they saw these ties that plants wearing them must be carefully watched and their seeds saved, while their sisters with the accustomed golden dresses must be rejected.

The second year thousands of *Eschscholtzia* pupils were in the school. Soon they spread their bright petals to the



THE CRIMSON ESCHSCHOLTZIA
(Red California Poppy)



See their "little white ties."

breeze, and to most people were not unlike their brothers and sisters in the field. The master came again with the badge of honor, white neckties. Many of the pupils were like their ancestors and waved their saucy yellow heads as if to say: "The Spanish fathers called me *Copa de oro*.* I represent the great gold fields of California. I am the State's adopted flower. I have stood for centuries weaving the golden sunshine into the meshes of my gown. I'm not going to change my beautiful dress of gold." Burbank, however, passed these saucy ones by and found some more obedient; they had crimson in their petals. These were chosen and promoted.

* *Copa de oro*—Cup of gold.

For eight years this selection went on, and a beautiful crimson poppy is the result. Since this time, through selection, other varieties have been grown, until now we find little *Eschscholtzia maidens* in all kinds of beautiful dresses. Some are snow white, others range from light cream to straw color. Many are a deep-purplish crimson, while others have decided to wear pure crimson with golden yellow for trimmings.

Eschscholtzias of these colors and shades are now being graduated from the plant school and enjoyed by people throughout the world, while the golden blossoms continue, as before, to brighten the hills and valleys of California.

CHAPTER XIV

THE FIRE POPPY

One day two little poppy pupils, *Opium* and *Oriental*, came to the plant school from far-away Asia. They were not at all alike in their habits. *Oriental* was a perennial, that is it grew from year to year, while *Opium* was an annual, and must be raised from seed each season. It did not seem possible to combine the two plants and make an entirely new poppy, but the master said, "Wait! Let us see about it!"

Opium had for a long time borne a bad reputation because of its furnishing a poisonous juice. Strange to say,

some people form the habit of taking opium, a drug made from this juice. It makes them sleep a great deal, and in time they seem to care for nothing else, so they are failures as human beings.

The master's work is not only to train good into his plant pupils but to train out the bad; and he was certain that he should not have the charge of being poisonous, hang over the life of the new poppy, for with this flower he had planned to brighten homes everywhere. So he instructed Opium to cultivate only the good qualities which he wished the new poppy to possess.

When these two poppies, Opium and Oriental, were placed in their class, right across from a group of snowy lilies, that continually suggested purity in their sweet, spotless robes, they seemed to forget much of the scenes and work of their former lives in China and India, and to think only of the lessons to be learned in the plant school. Oriental missed Opium all through the long summer and autumn, and, indeed, most of the year, for Opium was only a short-lived spring flower.

Oriental's leisure time was spent in making new acquaintances among the many plant people who were there from every land, also learning all it could and amusing itself as well.

The plant people are not deep thinkers, but none of them are without some wisdom. The tulip poppy did some very cunning things that caused them all to rustle

their leaves in laughter, as if they were tittering and clapping their hands. The wind always enters into their enjoyment, and can tell some of the most beautiful stories of all.



Poppy.

This was the trick of the tulip poppy. When a bee lit upon her bright blossom, she closed her two inner petals tightly together and held him fast, as you would catch a butterfly with your two hands. Mr. Bee then set up a furious buzzing, which grew louder and louder, calling for help. If the master chanced to be where

the cry reached his ear, he sometimes unclasped Miss Tulip's hands and gave Mr. Bee his freedom, otherwise he must remain a prisoner until she chose to let him go. This was a funny way to send her golden pollen to other poppies, but it was a good way, for when Mr. Bee escaped he was laden with the yellow dust, and, lighting upon another poppy, he left much of it there. Mr. Bee never seemed to understand this trick of paying for the honey he sipped, for bees are always heard humming in the poppy class.

When the plum trees blossomed in a burst, Opium awoke from the long, long nap to greet Oriental with a wealth of blossoms of many colors. Oriental was dressed in scarlet, the large single flowers looking very attractive. Burbank chose one of the finest blooms and shook it gently over Opium's head, so that the pollen from Oriental's anthers fell upon the stigma of Opium. In this way the two poppies combined, and the teacher looked with great interest to some wonderful poppies as the result.

The next season the plants from these mixed seeds were of great variety in both form and color, and especially so was their foliage, no two being alike. Some had woolly leaves, some hairy ones, while others were quite smooth. Some were a light green, others were quite dark. The flowers were scarlet, crimson, white, purple, and yellow. The seed pods or vases differed greatly. Some of them were from four to six times larger than those of either of the original poppies, others were scarcely larger than the stem that bore them, while in some the pod was entirely absent.

The seed pod of the poppy is much like a pepperbox, with holes not on top but under the brim. In this way the seeds are safely housed from the weather until they are ripe, when you can shake them out as you would pepper from a box. If left to itself, the pod will bend over and sway to and fro for the wind to scatter the seeds. Surely Mother Nature has been very thoughtful in providing so

comfortable and so beautiful a cradle for the poppy's seed babies.

For many years the offsprings of Opium and Oriental were patiently trained, until at last their education was completed. Each joyous graduate wore a glowing gown of fiery red with a purplish spot at the base of each petal, so it was christened by the master "Fire" poppy.

CHAPTER XV

THE LILY PUPILS

What a time they must have had getting acquainted—those fifty pupils! Some of them had come from the tropics, and some from the frigid zone. There were the tigers, the Alpines, the auratums, and I could not tell you all, for some were great strangers. But there were tall lilies and tiny lilies of every shade and color.

It had been thought such a difficult task to train a lily, that no one before Burbank had given the subject much attention. Indeed, some had said, "It is no use—the lily cannot be taught." But he had faith in the intelligence of this favorite flower, and believed it would respond to his love and care and reward his efforts, even if it should require a great deal of his valuable time to teach it. The idea of the lily, of all flowers, not desiring a higher education!



THE FIRE POPPY

So here they found themselves in the plant school, in a most delightful California climate, where they could all be together in the open, and enjoy the fragrant breeze and the glorious sunshine, and just grow and grow.

Some of them had known little of outdoor life before, having been shut up in the stuffy air of a hothouse. Some had grown in the cold North. What a joy to breathe in the balmy air and to drink the dew, with no fear of being withered by heat or pinched with cold. Sweetest perfume was sent forth by some of them, while most of them had no odor at all.



A native Pacific coast lily.

They were an odd-looking lot in form and color—no two alike. The California lilies felt their importance, we are sure, for they were at home, and all the others were their guests. Then, too, they were to assist their teacher largely in training the strangers to new ways. Little

Miss Washington, courtesying low, was very proud of her fragrant white dress. Mr. Tiger in his speckled brown coat tried to be very entertaining, while the graceful brown lily chimed her mission bells. Miss Ruby, the tall, stately mountain lily, in her shell-pink gown, bowed to each in turn, swinging her censer of perfume, which is said to be the finest in the whole world. Each tried to outdo the other in the reception of their guests, for but one thought was there, and it was this, "We will make them happy in their new home."

They all remained at Santa Rosa until each had received its first supply of pollen, then the Gold Ridge grounds became their home. Two acres were given to the lilies in which to receive their higher training.

In June when the blooming season came, a rare mingling of perfumes filled the air—thousands of odors blended into one. Nothing like it had ever been known before in the whole world. The people of the Gold Ridge section wondered and wondered what it could be; and they came from all around to investigate the cause. As they came nearer and nearer, such a mass of beautiful colors spread out before them as they had never before even dreamed of. When they came close the lilies nodded and nodded, and swung their censers, bidding them to behold their exquisite colorings and quaint forms, for nothing in the world could compare with them. Each lily seemed to do its best in appreciation of what the teacher had done for it.



A field of lilies, showing heights and styles.

Some had only one petal tightly rolled up; some had two petals like the wings of a gorgeous butterfly; others had three, four, or five petals; while most of them had six, as the other lilies have.

There were all colors, shading from white, or palest straw color, to the deepest yellow, orange, crimson, or brown; and there were spotted and speckled ones—all mingling with the different shades of the green foliage. Their stems were from six inches to eight feet in height, some having a single stem, others branching ones. A few bore as many as fifty flowers on one stalk; and there was

one that seemed to outdo all the rest in its profusion of blooms, for it carried ninety-one flowers on a four-foot stalk. The bulbs were as great a study as were the blooms,



One of the fragrant new lilies.

differing greatly in color, form, and size.

Out of that large class of two hundred and fifty thousand new lilies, Burbank selected fifty that came up to his ideal—that had rewarded his tireless efforts by being obedient to his requests.

“Can my thoughts be imagined,” said Burbank, “after twenty-six years of care and labor, as I walked among them on a dewy morning, and looked upon these new forms

of beauty upon which other eyes had never gazed? Here is a plant six feet high with bright yellow blooms; beside it one only six inches high with darkest red flowers; farther on one pale straw, or snowy white, or with curious dots or shadings. Some deliciously fragrant, others faintly so;

some with upright flowers, others with nodding ones; some with dark green woolly leaves, others with polished light green ones.

“As the fresh, dew-laden petals of these new creations, which had never been spread out to the light of day, were unrolled before me, a new world of beauty seemed to have been found, and I was fully rewarded for all the care I had bestowed upon them.”

CHAPTER XVI

THE CALLA'S STORY

This is the story of the calla. She told it one day to her friends as they rested in the shade of the trees. It was near Eastertide, and the whole circle of flower students was interested, for they knew that it is at Easter time the callas are most sought.

“We were not always so graceful as we are to-day,” the story-teller began, in a low, soft voice. “Ages and ages ago, when our ancestors lived in the wilds of Africa, we had only a long yellow spike to make us beautiful. This was surrounded by a number of broad green leaves. After a while one of these leaves grew larger and gradually folded around the spike, forming a flower cup. It took many, many years to make this change, for Mother Nature, who is our teacher in the wilds, works slowly.

Then we wanted to attract the insects so they would carry our pollen to other spikes.

"Nature taught us to change the color of the green to white. Some of my relatives, however, chose pale yellow as their color, while others preferred dark yellow or orange.

"I was the first calla to enter the school," continued the speaker. "I am known here as 'White Calla,' but by many people I am incorrectly called 'The Lily of the Nile.' You see I am not a lily at all, for lilies have six petals, which bend gracefully from a central stem.

"The master has trained many of his calla class to bear very large blossoms. This he does by selecting, year after year, the largest of our number for promotion. As a reward for his labors one of our class succeeded in producing a blossom ten inches across on a stem six feet high. So far as we know, this is the largest calla that ever graced a stalk so tall, and we are proud of our class record. We feel like challenging the world, having size, grace, and beauty, the points at issue.

"In another class of white callas, which we call 'the little gems,' the master trained for small flowers and short stems, so that there might be a calla suitable for bouquets. Each year he chose as the graduates the very smallest and most perfect callas. At last a regular Tom Thumb was obtained. A perfect white blossom less than two inches across grew on a stem about ten inches high.

"But by far the largest number of callas to enter our

school were the wild tribes from southern and central Africa. They were a curious group when they arrived. *Calla Hastata*, Pride of the Congo, was adorned with pale yellow blossoms having dark yellow spots. *Ellitiana*, from Cape Good Hope, had large golden yellow flower cups and green foliage spotted white.

“The blossom of the pupil from Natal might be compared to a coat of many colors, the outside being a delicate pink, the lining a rose purple with crimson shadings.

“One of the smallest foreign pupils bore flowers of a greenish yellow with a spot of dark crimson at the base.

“A calla from Cape Town had a small yellow flower shaded with purple, and its foliage was sprinkled with yellow dots.

“Our master placed all these in one large class, and began their training by pollination* and selection.†

“A few years passed rapidly by, then a gorgeous array of callas was seen at the Gold Ridge school. They were of many forms and sizes; some were tall and large, others short and small, some strong, others delicate. In color they ran from nearly pure white or light yellow through all the shades to dark yellow; also purplish and crimson. The foliage was even more varied than the blossoms. There were large leaves and small leaves, hairy leaves and smooth leaves, green leaves striped with white, spotted

* Pollination—conveying pollen from anther to stigma.

† Selection—choosing the best specimens for further development.

and mottled in brown or purple. The master walked among them sometimes in almost speechless admiration.

“Our school is justly proud of this class, for from these wild African plants have been graduated many callas that are strong and will flourish in the open in any semitropical climate. The blossom of each calla graduate is indeed beautiful. The foliage of some is a bright green with golden spots, others have green foliage spotted with white, while still others have only the rich green of the white calla.

“Lemon Giant, one of the noted graduates, and Fragrance, a beautiful white calla, have attracted the attention of florists all over the world.

“I beg your pardon,” said modest Calla as the story was finished; “I did not mean to talk so long and to give so much praise to the great calla class, but I do want you to understand the training we have received in the plant school.”

CHAPTER XVII

THE AMARYLLIS PUPILS

When Amaryllis entered the school all her family who could live in the open wore simple, unattractive colors. Those who did live indoors in conservatories were larger and more beautiful, but were very delicate, and when taken into the sunshine they seemed famished, failing to be revived even when moistened with refreshing dewdrops.



THE LEMON CALLA

The most beautiful blossoms were only four or five inches across. The bulbs, ordinarily, were about the size of small apples, usually having one stalk to a bulb, and two or three flowers to a stalk. A plant seldom produced more than one new bulb a season. Choice conservatory bulbs were sold at from one to five dollars each; consequently, only the wealthier people could enjoy the blossoms. Seeds were not commonly planted, as it required from four to five years for a plantlet to mature, bloom, and prove its quality. The blooming period extended over a few weeks in the spring.

Some of the pupils came from South Africa, a large number from Central and South America, while those from the conservatories were grown in different parts of Europe and the United States of America, but from whatever land, they were known by unpronounceable Latin names.

These amaryllis pupils were patiently trained. It was eight or ten years before the master could see much improvement, but when he fully understood their habits, large quantities of seeds resulted. These were planted, and frequently there were many thousand amaryllis pupils in the school at one time. The delicate hothouse plants combined with those more hardy, and those with beautiful blossoms mingled with the dull, unattractive ones.

When the master succeeded in producing a beautiful, sturdy class, he continued to train for an earlier, larger, and more abundant bloom, and to lengthen the blooming

period. The earliest bloomers were promoted. Those that were the first, and continued to bloom the longest, won the prize. Still the teacher was not satisfied; his pupils must resist disease and ill-treatment, and must produce many bulbs. The master's desire is that every one may enjoy all beautiful flowers, so the work went on until many young bulbs were found on one amaryllis plant. Each of these new bulbs when planted produced two or three strong stalks, and each stalk bore from three to six beautiful flowers, which often measured from six to nine inches across, and amaryllis blossoms were enjoyed from early spring to midsummer.

Training for beauty of dress and for variety of colors, shades, flakes, and trimmings was considered throughout the course.

The master of the plant school prefers simple English names for his graduates, but there were so many in the amaryllis class for 1909 that he decided not to give them separate names, but to number them, and to call them "The New Giant Amaryllis."

The farewell reception tendered the amaryllis class will be long remembered in the history of the plant school. The color scheme in the gowns worn by the one hundred thirty-six graduates was beautiful beyond description. One wore fiery scarlet with narrow white bands at the base of the robe; another, white overspread with shadings of pink, crimson, and scarlet. There was a snow white

dress lightly lined with crimson, also a dress of brilliant red. One was fiery crimson with bands of white, and another, clear velvety carmine with broad white bands.



Giant amaryllis.

One scarlet gown had deep crimson and rose shadings with crimson and white bands, and there was a beautiful flame red costume with blendings of faint pink and white. One costume was pure red, flaked with white; another was flame scarlet with short white bands.

A tall, graceful graduate wore a rich vermillion with bands of greenish white, while a shorter pupil chose white and pink, almost evenly divided. A general favorite was

beautiful in a unique gown, striped and shaded with rosy crimson, purple, and white. Another almost as popular was gorgeous in crimson, slightly tinged with pink, heavily banded, dotted, and flaked with white.

It would be impossible to describe all the magnificent gowns of the lovely graduates. Queen Rose attended the reception clad in all her beauty, but even she was equalled in gorgeousness of dress, for since the establishment of the plant school no class had left its corridors in such splendid array.

When beholding a gorgeous sunset with its varied delicate shades and brilliant colorings one may catch a glimpse of that splendor which was woven into the gowns of the sunset class.

CHAPTER XVIII

THE RAINBOW CLASS

In the little New England garden of Burbank's childhood home grew the old-fashioned gladiolus. It had a tall stalk with a number of small, brownish crimson, lily-shaped flowers. The flowers were all on one side of the stem, and bloomed irregularly; those that first opened were faded and dying before the slower ones greeted the summer sunshine. Thus the flower stalk was never perfect, and the faded blossoms had to be removed else the plant presented a ragged, untidy appearance.

Another unhappy feature of the gladiolus was its awkward stooping habit, as if it were about to fall over, or did not care whether it stood straight or not. Often it might be seen with a soft cord passed around it and on around a stake, but in spite of every suggestion gladiolus would not stand erect.

When the plant school was established, Burbank chose, among the many other flower friends of his childhood, the gladiolus as a pupil. He loved his old friend, and wished to teach it to overcome its imperfections. He admitted many cultivated varieties from Europe, but these, like their American cousins, had weak stems and petals too delicate to withstand exposure to wind and bright sunshine. Large classes of European and American gladioli were formed, and at the close of the term the assistants put white ties on those the master wished promoted.

In southern Africa other kinds of gladioli grew; although these were wildings their brilliant colorings and markings were needed to blend with their American relatives. These African plants were brought into the school. Many were grown that the most beautiful and most perfect might lend their assistance to the master in training the stooping gladiolus to become more graceful and to produce larger and more lasting flowers of brilliant colors.

Season after season selections of the best were made, until at last the long slender stalk disappeared, and in its place was a short stem, so closely set with large beautiful

flowers as to be entirely hidden from view. In cool, pleasant weather the first blossoms on the stem remained to say



Gladioli.

“Good-morning” to the last flower that bloomed. There were blossoms of distinct colors and blossoms of many hues and shades with brilliant markings.

For ten years gladioli remained in the school, and during that time nearly a million young plants were grown from seeds. But plants have enemies as well as people, and these enemies visited the plant school as elsewhere.

Gophers became so numerous and destroyed so many bulbs that the master decided to graduate the entire gladiolus class.

He was very sorry to part with his pupils, but the sacrifice was necessary that the enemy be overcome. He gave his most beautiful graduates distinct names. One was almost double and wore a gown of deep pink, shading to white. This he named California. Another, white shaded

with purple, was called Shasta; others received the names Santa Rosa, Yolo, Mariposa, and other California names.

Although surrounded with beautiful flowers from all parts of the world, and busy with fruits from every clime, the master did not forget his gladioli pupils. So, when at last the enemy was exterminated, he decided to admit another gladiolus class.

Training at once began. He crossed and selected from thousands of seedlings until the members of the gladiolus class became almost countless. Still promotions continued.

In the Gold Ridge school may be seen numerous long rows of gladioli. The plants, standing close together, present one solid line of foliage and flowers reaching from the roadway over the sloping hillside. They do not now need the stake of the New England garden for a support, for the strong, straight stem stands erect entirely surrounded by blossoms. The gladiolus pupils have been taught to stand like soldiers.

To describe the dresses of these thousands of gladioli would take too long, for there are all the exquisite intermingling colors, shades, and tints one often sees at evening in the Eastern skies after the passing of an April shower.



The wilding in training.

CHAPTER XIX

THE WILDING

She was hanging over a mossy bank above a mountain stream near the geysers, about fifty miles north of Santa Rosa, when the master found her. The flowers, which remain beautiful a long time if placed in water, were all dried up, and the leaves had turned very red. She seemed to be getting more and more impatient because she could not reach the clear, sparkling water below. There is a law in

the plant world that chains them to the soil, and this is one of their greatest difficulties, for it makes them so helpless. Perhaps hanging there a long time had affected her, for you know if you hang with your head down, you get very red in the face. Still, she might have been only embarrassed. At any rate, it was a real kindness for the master to rescue her from her dangerous position.

"Almost perished for want of a good drink, that you have tried so hard to reach but could not, you poor thing," he said. "Not even strong enough to make your wants known. You shall have a drink right now, and plenty of refreshing showers when we get home. Then we will see what you are good for. You must have been very beautiful at one time. You are a child of the early summer, I see." And he, who believes a weed is but an unloved flower, carefully disentangled the rootlets from the mossy bed, and examined the one crisp leaf that showed something yet of its delicate tracings and former richness.

That was how Miss Wilding came to be in the big sack with a currant and other wildings. She was too weak and timid to tell this to them, and, although she was greatly refreshed by the cool drink, she had neither strength nor courage yet to hold up her head.

But it was not long before this strange little wild beauty was wide awake and cheerful, growing thriftily to show her gratitude for the gentle mist that was sprayed upon her daily. The exquisite colorings of her gown, light

green, red, and brown, were the next season in all their fulness; and she proved to be a healthy, hardy child of the wildwood, one that was quite sturdy and willing to learn.

Her flowers were dainty and graceful. They were often given pet names by the country children, such as "coral bells" and "rosy morn," when they gathered them in the shady woods on the way to and from school. Once a year a "wild flower day" is held in many of the schools, when the children strive to excel in the number of kinds they can gather for the exhibit. These dainty bells are generally found at that festival.

The master knew there was a bright future for little *Heuchera* (for that was Miss Wilding's proper name) as an ornamental or foliage plant. With her richly colored, finely veined leaves, he was sure she would excel, so he placed her in that department, and her training for that purpose began.

Seeds were sown and the best of the thousands of plant children were chosen. At each visit of the master *Heuchera* was encouraged to deepen the tints of her gown, and especially to adorn it with more frills, and each time he found her increasing in loveliness, showing her to be obedient and studious.

Nature is never in a hurry, but at last she gave *Heuchera* the most exquisite and most highly colored foliage of all flowers. In this humble little plant Burbank saw the

poetry and beauty of floral wealth and wrought it, as no poet with pen or artist with brush could, into a new life.

CHAPTER XX

THE ROSE AND HER PART

“Oh, the rose, the rose, the queen of the garden, has come!” chimed on the soft June air. Every flower child danced for joy and every fruit child waved its arms in a welcome greeting.

Yes, the queen was there, the dear queen, Hermosa, still wearing her pink gown, looking a wee bit old-fashioned, to be sure, but as sweet and profuse in her offerings as ever she was.

People learned to love Hermosa long ago, and even now, with such a wealth of roses of all shades and colors, no garden seems complete without her. True, her blossoms are quite small sometimes, but there are always so many of them to make up for their lack in size. But you do as Burbank does, and watch the effect. He is always mindful that the plant people have plenty of room, plenty of rich soil, and all the sunshine they need, so that they can grow as children do who have a good, big playground and plenty of wholesome food.

Hermosa came into the school for a special purpose—a new rose had been planned by the master, a rose for

everybody. Her ever-blooming quality was one of the leading elements needed in this new creation. *Hermosa* is probably the best known of any one in the entire rose world; but, as she rarely produced seeds, no one up to that time had tried to improve her.

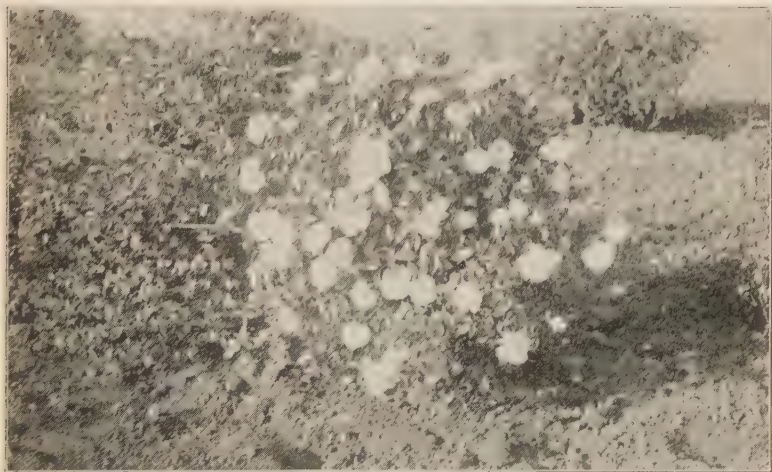
The rose family is a very distinguished old family, and also a very large one. We cannot tell you where the first grandmother rose came from, but a great many of the roses of to-day came from the Far East. So the first rose may have lived in the Garden of Eden, though whether she was a tiny little plant, a vine, a shrub, or a great big tree, we do not know, or whether she grew thorns or not, for it was so long ago. Some believe firmly that a cousin of the rose, the apple, was a resident of that garden.

We are told that to be an aristocrat in the plant world is to be a descendant from a long line of plants that have kept on improving; so the rose, it seems to us, must be an aristocrat. This we know: the rose is the emblem of beauty and delight and the rosebud a sign of innocence and purity. The school was greatly honored by the coming of the rose, and it is no wonder that a quiver of excitement went through the garden when she entered.

After *Hermosa* other roses came to assist. Among them was *Bon Silene*, noted for the beautiful form of her buds and for the profusion of her blossoms, which were a deep rose color shading to rich crimson.

Hermosa, like all plants, wanted to grow and bear seeds;

and, like them, all she asked was to be made comfortable. Roses are especially fond of rich loam, and you may be sure that they received this. They were not



Burbank rose plant.

crowded in the least, nor choked by greedy plants. They are rather fond of small flowers at their feet, but nothing must shoulder them.

The few seeds which Hermosa gave as her first offering to the master were planted with great care, and when they felt their coverings becoming moist, the seed babies began to think of awakening and stretching their limbs, and perhaps smiling and yawning and cooing, as real babies do.

It was not a great while before a flush of pink ran along the row, for each of Hermosa's babies wore the pretty pink gown. The master could tell which of the little



Santa Rosa rose.

pink princesses should remain with him to assist in the making of the new rose. When the second generation of princesses were in full bloom, Bon Silene came into use, uniting its beautiful form with the fine qualities of Hermosa's healthy offsprings, by giving golden dust to apply to them.

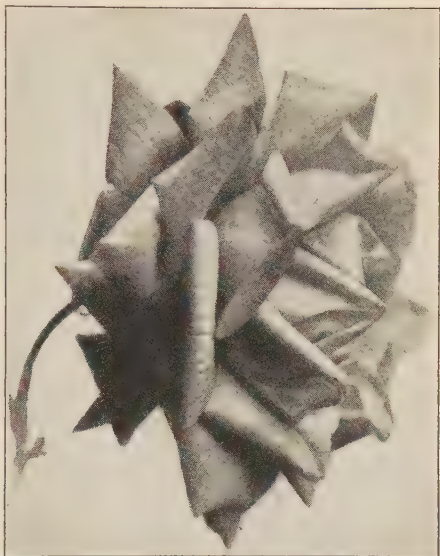
After this many thousands of rose plants were seen growing in the plant school at one

time. When these were all blooming, we think, must have been the time when Burbank heard them say to the other children:

"See what we have to offer you, beautiful roses! Help yourselves; but we are frail bushes, so do not be too rough, else you may feel the stings of our armor, which we still

have to wear." At least the master tells the children that rosebushes say this.

From the third generation of pink princesses crossed with Bon Silene came two fine new roses, the Santa Rosa, which had been planned, and another that was christened "Burbank." The Santa Rosa is a wonderful rose in brilliancy of color, size, and habit of



A Burbank rose.

growth. Each little one commences to bloom as soon as it starts from a cutting, and grows freely and easily, blooming right along. Its flowers are a rich shell-pink, inclining to crimson, full and double. It is truly a rose for everybody.

The Burbank rose, like its creator, has energy and enthusiasm. It begins to bloom when quite small, and continues to bloom throughout the year, if the climate is not too severe. In cold climates it rests during the winter and comes forth at the first call of spring. It is double and of fine form. Its color is deep rose-pink, and it is

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so delightfully fragrant that it would do you good to bury your nose in its sweetness. The Burbank is the freest bloomer in the rose world; and it was awarded the gold medal at the World's Fair in St. Louis, Missouri, in 1904. This it won over all competitors as being the best bedding rose in existence.

Burbank is exceedingly fond of the rose, and has sent other noted ones from the school to gladden rose lovers. One of these, the Corona, is indeed a rare and charming flower. It is a climber, produced from seedlings of the crimson Rambler. Its flowers resemble Chinese primroses more than they do real roses, and they grow in very large clusters. It is a fine bloomer and forms a bower of rare loveliness throughout the season. Its blossoms possess a quality entirely new in the rose, which causes the flowers to remain fresh on the bush for weeks, where others fade and drop their petals in a few days.

CHAPTER XXI

FRAGRANCE

There was in the plant school a society of flower pupils who sympathized with one another because they lacked the sweet odor which appeals to every one, and which many of the more favored flowers possessed.

Now, the fragrance is the spirit of the flower; and without spirit, you must know, one can accomplish little.

One of these, the dahlia, seemed to shrink from contact with others, and did not care to be touched; for it had long since learned that it lacked the one crowning quality, fragrance.

In fact, it had often heard remarks like this: "What a pity the dahlia has no perfume!" "What a delightful fragrance the violet has!" "How refreshing these sweet peas are!"

Naturally, it was a little jealous and envious; but it was seemingly so helpless that it must be pardoned this weakness.

Year by year Burbank had noted its development in becoming more beautiful and hardy; and from time to time dahlias from other lands had been introduced to assist in improving the style of dress and its rich colorings.

One day she heard the teacher say: "The dahlia is such a fascinating child to teach. I wish I could persuade her to become fragrant. She is very obedient, so I am still hoping that she will follow my instruction in this."

Then this little discouraged pupil took courage, and began to do all she could to help herself. She was surely a delight to look upon. Her dress, fine and rich, was neatly made, and its colors were always pleasing. Single dahlias were too fine in appearance to be compared to anything. So she was known as a coarse flower only because she lacked fragrance. She would be so happy and useful if this fault could be corrected. You know the bee is the



New single dahlias.

happy guest of most flowers, but the dahlia was not attractive to them, though she waved her bright banners as they hummed by.

There was a touch of pride in the single dahlia, for it had heard Burbank say to a visitor one day, "I like single dahlias better," and touching the long, graceful stem, he added: "See this stem; it is three feet long. I have worked

a long time to give it this long and strong but slender stem."

Some time after this, as he was passing the dahlia class, there came to him a faint fragrance, which was very sweet. He felt quite sure his hopes were coming true—that the dahlia would attain the perfume she so much desired, and be promoted to the class of fragrant flowers.

He sought out the one flower that gave forth the fragrance, and guarded it until the seeds should ripen, which in due time were carefully planted.

Some of the little seedlings gave from their first flowers a hint of perfume like the rich magnolia blossoms. These were carefully protected and cared for by the master. For several years he gave them special attention, selecting and planting only the seeds from the fragrant flowers. Finally the full reward came—the prayer of the dahlia was answered, for one had the full, sweet fragrance of the magnolia.

The dahlia was thus given a rare and lasting perfume by selection alone, under the direction of a great, understanding mind.

The verbena, which was scentless most often, but sometimes had an unpleasant odor, pleaded for fragrance, also. It was a lovable child otherwise, always clothed in dainty, delicate colors.

At the close of a summer day, as Burbank was walking among his plant pupils, he paused by the verbena plot,



Verbenas.

for there came to him a faint, sweet perfume. He eagerly examined every blossom, hoping to find the dear little one that had greeted him with a response to his oft-made request. But no—the shy maiden had hidden herself, and with a feeling of great disappointment he moved slowly on.

A whole year passed, and on just such a balmy evening, in the dusk, the fragrance came to him again as he neared the plot.

This time the search should be more thorough. He

would see to it that she did not hide from him. Stooping closely, he plucked bloom after bloom, for you must know that they are lowly in their ways.

At last he came upon the one that breathed a faint, sweet fragrance—a suggestion of the arbutus when it first opens its spicy blossoms. You may be sure that he marked well his treasure, and encouraged it to put forth stronger efforts, and when its seeds were ripe they were labelled and placed in security until the season for planting came.

From that time for several years a selection of the most fragrant flowers from the offspring of this verbenal pupil was made, closely watched, and tenderly cared for. The fragrance became more and more pronounced with each year's selection; and finally one was found to have the full sweet fragrance of the trailing arbutus firmly fixed, and was given the name "Mayflower," which is the common name of the trailing arbutus. This little maiden wore the same dainty pink dress that has always adorned the arbutus, and was well named for both fragrance and color.

The next one in this society to have its prayers for fragrance answered was a calla, or richardia. It had no odor, but was otherwise a great favorite. It had already been a pupil of the school for several years, and during that time had changed its size, and the color of its dress had assumed many tints and shades. She patiently awaited the gift of perfume. At last it was granted her, and she was ready to go forth into the world. This calla now lifts

her head with stately pride to those who love her, and gladdens them with refreshing perfume.

This docile child Burbank calls "Fragrance," and delights in the great profusion of her blooms.

This society is now a happy company, shedding refining and elevating influence everywhere. And oh, how gently the work of training was done! No harsh treatment, but kindly care and earnest sympathy, guiding Nature into right paths, as a tender parent guides the footsteps of a little child.

CHAPTER XXII

THE LITTLE IMMIGRANTS

Six little immigrants from across the wide ocean coming to

"The land of the free
And the home of the brave."

They came on the long journey, half around the globe, to be educated in the plant school.

Oh, how tired, thirsty, and cramped they were after such a long journey, closely packed in a tightly sealed tin box. It was hoped that they would sleep all the way, just as many plants do during the cold winter months; so probably they knew little of the experiences of the journey.

They were brave little fellows to come at the master's request, for once before some members of their family made the attempt and perished on the way. Although the climate of Australia is not greatly different from that of Santa Rosa, yet the travellers had to pass through the tropical regions and to remain more than a month in close confinement.

The master, who was awaiting the coming of the new pupils, eagerly broke the seal and opened their prison house, then tenderly examining each, placed it in damp, mellow earth.

Soon these six little rhubarb plants began to expand. By degrees they became very wide awake, and sent up green leaves on beautiful crimson stalks. Once established in the plant school, they proved to be very promising pupils. Although the crimson stalks were scarcely larger than a pencil, they were ready for use months before the larger varieties with green stalks made their appearance.

The master determined to combine this little crimson rhubarb with the then commonly grown rhubarb, which is larger and has a very sharp acid, hoping thus to obtain something superior. So when blossoms appeared—tiny, greenish-crimson, feathery flowers on tall stems—he made the experiment, but none of these seedling plants were up to the desired standard.

Then selection alone was continued from year to year; the one plant having the qualities he sought was chosen

from among thousands of seedlings, until the Crimson Winter Rhubarb, which has made fortunes for so many small farmers, was obtained.

There are many points to be considered in the process



Crimson Winter Rhubarb.

of testing for selection. In this case stalks from several of what appeared to be the most promising plants were numbered, cut, labelled, and taken to the kitchen. Each was cooked separately that its flavor might be tested and compared, also the time required in cooking, the amount of sugar needed, and so forth, was carefully noted. Each was served separately on the master's table. Fruits and

vegetables are often thus tested at the Burbank home; sometimes each potato on the dinner table will be of a different kind, or corn or peas of a certain variety are served one day and another kind the following day that accurate comparison may be made. Every hour of the master's is made to count in the service of humanity; even guests as well as members of the family often have a part in deciding what fruit or vegetable shall be given to the world.

This test at regular meals is much pleasanter than the testing of fruit on vines or trees. Perhaps you think it would be great fun to accompany the master as with a helper he goes rapidly along a row of vines laden with luscious ripe berries, taking a berry from each plant and noting its flavor and quality. But you would soon become very tired of tasting and would wish you had brought a cracker or a few nuts in your pocket. Very few persons can stand this tasting of fruit for more than a few minutes at a time. Burbank, who is as keen in appreciation of flavors as in his observation of forms and colors, tastes rapidly, and will continue the process for a considerable time. The process of testing fruits in the field is quite different, as you can see, from eating it at your leisure and for your pleasure.

Although the Crimson Winter Rhubarb was so superior in beauty and quality, a plant of greater size was desired, and selection was continued for several years, until the

New Giant Crimson Winter Rhubarb was developed. This has been often called "the mortgage-lifter." No vegetable of equal value has been introduced for many years. It is welcomed as a winter and spring dainty, coming early in the season, when a mild acid is craved and fruit is scarce. Its beauty of appearance, its delightful flavor, and its health-giving quality make it a general favorite. It will not stand the extreme cold of the North, but is readily grown in any mild climate. Car loads are each year shipped into the markets of the Northern and Eastern States in the early winter and spring from California and Florida.

The Crimson Winter Rhubarb in its new and improved form has returned to Australia to be grown in large quantities. It now flourishes in the royal gardens of England and Japan, and has made its way around the world.

CHAPTER XXIII

BRAMBLE'S STORY

One evening in summer, after lessons were over, the pupils were seated around the warm, glowing fire of the great setting sun. They were tired, and to rest themselves began to tell, one by one, the stories of their lives. Some related very interesting tales, then Bramble began.

"I was the first bramble to enter the school," said he,

gracefully bending a long, slender body as if to salute his classmates. "My home, and the home of all brambles, was for ages in the forest. We had a hard struggle to live, for the mighty oaks, pines, and red-woods crowded us and stole our food, until we were driven into the thicket. We greatly enjoyed trailing over the banks of the woodland streams, but when forced to leave these cool places we sought the open, and if a friendly fence kindly offered support, our slender arms clung to the long, rough rails thankfully, for our ripening fruit could there enjoy the sunshine.



A native bramble.

"All the boys and girls liked us and eagerly looked for us; for they said we were much better at heart than our aristocratic cultivated relatives, the blackberries. My! how those girls scolded at our little needles when they took our fruit. I know our thorns are sharp like daggers,

but we have, for a long time, been obliged to carry them for protection, for great bands of cattle and sheep used to lay waste our homes. Crowds of men, too, used to fall upon us and trample us under foot. Had not my people carried many short, sharp swords, I am sure we should have all perished.

“One flowery, dewy morning in spring a strange man called on us. I never saw any one like him; he was in sympathy with us, for he looked us all over carefully, and did not scowl at our stickers; then he took hold of me and carried me off bodily. I did not know where I was going but I felt very safe. His kind touch gave me courage and confidence. Playmates, you may be surprised that the strange man was our present teacher, who has trained us so long.

“Now, Siberia,” said Bramble, who had made this long speech, “tell us your story.”

In a low, whispering voice, like a gentle south wind, Siberia began. “My old home is in far-away Asia. I love my native land, let me tell you, but there we Siberian brambles had to fight for our lives, just as you American brambles have done. The people of my country did not care for me; they called me ‘seedy.’ I was so very small they banished me from their gardens. I am glad to find in my new home one who makes me welcome.”

Early the next morning the air was so pure, the sunshine so refreshing, the birds sang and called so merrily

to their mates, that all the brambles decided to put on their white summer-blossom trimmings. Soon fairy-winged butterflies fluttered and humming bees crooned around them. Then the master came. He visited wild Siberia first and got some of the golden pollen. This he took on a watch crystal and put on the blossoms of the bramble.

When the plants which grew from the seeds of these blossoms were old enough, hundreds of snowy petals fluttered in the breeze; but when the master came to examine them he found that they had dropped their snowy blossoms, and there was no fruit to reward his labors. It seemed as if the brambles were useless, after all, and should have been left in their forest homes.

The master decided, however, to give them a second trial the next season. Again in fruiting time every young berry pupil in the school was carefully examined, and as there were many thousands, it required much valuable time. Just as the patient teacher was about to give up, he found one berry pupil that was worthy of promotion.

Boys and girls ought to be glad that in their schools so many are sure of promotion, for in the plant school many hundreds, yes, even thousands, of plants try and fail. Only one little bramble passed the final in this severe work. But never a plant pupil was discouraged.

The new berry which resulted from the cultivation of the bramble was large and juicy and very dark in color.

Vines were grown from seeds of these new berries that gave fruit earlier than any other known berry; and, still



Hybrid blackberry leaves. Both from seeds of the same plant.

more, they continued to bear throughout the summer and were very productive.

This proved to be an entirely new species of bramble. None like it ever existed before, so Burbank named it "Primus," which means the first. It usually takes many generations of plants to fix a new fruit, but his new berry from the wild Siberian raspberry and the wild dewberry of California, sometimes called the trailing blackberry, was an exception. Many thousands of seeds were planted, and every one came true, bearing Primus berries, proving that the species was fixed.

Thus through skilful training two wild brambles, with uninviting qualities, have been made useful, and another creation has been brought into the world.

CHAPTER XXIV

THE TRAINING OF THORNLESS

“Let us out! Please let us out!” pleaded a chorus of wee, wee voices from the envelope, “we are so dry that we feel as if the life within us were perishing.”

The seal was broken and the tiny berry seeds were poured into the palm of the scientist's hand. Just a few seeds from a peculiar blackberry, sent by an unknown friend in the East! The letter was short, only a few words, but the master knew that the seeds might contain a prize, so he folded the letter carefully and placed it among his choice messages. The berry seeds were taken to the kindergarten department of the plant school.

Here they were given a warm bed of earth in which to lie. The master knew they would be happy in the lap of Mother Nature, for she gives light, moisture, air, and plant food needed to strengthen her children.

Summer with her glow of warmth and mellow sunshine was fast approaching, when the teacher decided to give his new pupils their first test. To his surprise and delight he found that some had small, slender arms that were almost

smooth. These were allowed to remain in the school. The next year, when they were clad in white, they looked very beautiful. Soon small, green, gnarly berries took the place of the snowy blooms, and later, when the fruit was ripe, it was nearly as hard, knotty, and tasteless as when it was green. The master now understood well that the task of making his pupils of the envelope perfect would be a difficult one, still he persevered.

Seeds were saved, and the following spring the kindergarten was crowded with more young berry pupils. Their promotions were made on their willingness to leave off their weapons of defense, so the little fellows had to undergo the test. When one was found that appeared to be making a desperate struggle to free himself from thorns, he was given a place in the Gold Ridge school.

Year after year for several years thornless vines were promoted from the kindergarten, until finally twenty thousand or more berry scouts had lain down their arms and stood in great ranks in the Gold Ridge school, an honor to their teacher and a blessing to all boys and girls who had received the stab of the sharp thorns on the blackberry vines.

Thornless surely felt proud when the world's great scientists, who visited the school, took his long, slender, smooth arms in their hands, placed them against their cheeks, stroked his glossy coat, and praised him for his beauty and for the delight he is to bring to the world.

To their words of encouragement the master always replied, "He is not perfect yet; more time is needed."

Thornless was in the school for twelve years, under the



The thornless blackberry.

constant care of the master, who, no doubt, could have trained Thornless to produce good fruit by constantly selecting the best, but where there is a shorter road to the goal, Burbank always chooses that road.

The choicest blackberries have been chosen, pollen has been taken from these, and with it the blossoms of the best thornless have been crossed. Selections of the best

are again made, until now the berries of thornless vines have attained a superior flavor, and in size equal the other cultivated varieties.

Thornless has at last graduated. He never shows a sign of a thorn and is as smooth as a willow twig. All children will hail his advent with delight.

How much of the future profit and pleasure would have been lost to mankind had Burbank destroyed the few seeds of the envelope cannot be estimated. The work of changing all our berries to thornlessness is progressing, but it is still in its infancy.

CHAPTER XXV

THE NEW STRAWBERRY

About thirty-five years ago a number of strawberry pupils from different lands entered the plant school. One came from New England, where, no doubt, many Puritan children had feasted on the fruit of its ancestors. Another came from Alaska, the home of the little brown Eskimo; while still another sailed over the broad Atlantic, then travelled by rail across the United States until it was so near the mighty Pacific that the moistened breezes revived its drooping stalk and withered leaves. Its home was in Norway, "the land of the midnight sun."

These plant pupils were a long way from home, still they were content, for they received the best of care from

their teacher. They were placed very near each other and soon learned the ways of the California berry pupils, which had been brought from the hills and valleys bordering the Pacific. There were also many varieties of cultivated berries, varying in color from the brightest scarlet to white. They trailed their slender forms along the ground, their polished or downy leaves spread upward to take in the pure air and to catch the bright rays of sunshine, without which the food could not be digested for the use of the plants.

For many years cross-pollination and selection of the best continued. When scarlet berries peeped from beneath green leaves, badges of honor were awarded those plants that excelled in any particular. Still the ideal berry was not produced, and it was finally decided to discontinue the task undertaken and give these berry pupils a vacation. Most of them were allowed to remain in the school, however, for they had become very dear to their teacher. In a plant school, as in a school for children, it is necessary for some pupils to remain longer than others.

After twenty years had passed, a plant collector sent to the school some seeds of a wild strawberry that grew on the high mountains of South America. These tiny seeds were sown in the kindergarten department of the plant school, and after being promoted to Gold Ridge they were soon ready for a fruit test. They were found to bear very small berries, but of excellent flavor.

In the school were strawberry pupils brought from the sand-hills near the coast. In their native home they are wise little plants, for they learned to protect their fruit by growing close to the ground. They sometimes even



Strawberries.

hide their red berries in the sand or under their leaves, so that the children have difficulty in finding them; and only those who have learned their habits return from a berry hunt with baskets filled with the sweet, juicy fruit.

A blending of these two new plants was undertaken, and the master soon had a class of berry pupils ready for Gold Ridge. The day for final examinations came all too soon. The teacher was disappointed, for out of the thousands of plants under training, not one had the desired qualities. So more education must be given.

Again the kindergarten was crowded, and again the workmen were kept busy for many days during promotion season.

Gentle, merry, laughing spring hastened rapidly by, but before she vanished smiling, white-petaled faces looked out from beneath the green canopies of thousands of berry pupils. The day of selection finally arrived. Such a variety of red-cheeked berries had seldom been seen. The master moved among his plant pupils with anxious anticipation. For more than thirty years his great heart had longed to produce a berry that would gladden the homes of rich and poor alike.

The search continued. Finally one was found. The ideal was at last attained. A plant bearing a most unique berry was seen among the thousands around him. The leaves of this new plant were thick and firm and covered with silky down, well protecting the ripening berries from the hot rays of the sun. The stalks on which the berries grew were large and branching. The berries were large, firm, and luscious, sometimes weighing an ounce each. They were a pale scarlet outside and a delicate yellow inside. The seeds, which grow on the outside of all berries, were so small on this new berry that they could scarcely be noticed.

John Burroughs, the naturalist and writer, visited the plant school, and when invited to taste the new berry, he exclaimed: "A most delicious berry; the best I have ever tasted!"

This berry has been named the Patagonia, after its original home in South America. Its long and excellent training has developed it into one of the best strawberry pupils ever graduated from the plant school.

CHAPTER XXVI

THE FLOWERING CURRANT

"I am bitter; please take me and make me sweet," pleaded a small voice almost choked with dust, as Burbank drove by one lovely autumn day.

The little currant held out its small blue berries covered with dense bloom, as if to show him what it had tried to do for itself.

His eye ever alert, his ear ever at the heart of Nature, and his sympathies never failing, he heard the call of this little country child. He saw its helpless condition and understood its longing for different surroundings.

Springing out of his buggy, he came close up to it, saying: "Ah, ha! so you would like to go to school and have me teach you with these other wildings I have here, would you? Come along, then, and we'll see what we can do for you; but, remember, you must be obedient and willing to help others as well as to help yourself if you wish to be made sweet."

He tenderly lifted her up, and little Hopeful soon found

herself in the back of his buggy jogging along toward Santa Rosa. The wood folk soon grew very sociable, for they were all together in one great gunny sack.

One said in rather an important way: "I'm going in for purity. I'm going to have my dress made white, for I heard him say so."

"I'm going to help train the Eastern lilies," put in the spotted tiger lily.

"Well, all I want is to get rid of this puckery bitterness," ventured Hopeful, "for people turn away from me in disgust; and I can never do any good in my present condition. I would try to grow more pulp but for that. What is the use?"

"It seems strange you speak of being so bitter when you carry such a delightful fragrance with you," remarked the wild geranium.

"Oh, that's just it. They call me the incense shrub because of my spicy odor; but when they taste my fruit they cast it away quickly with, 'Bah, but it's bitter!'"

The currant did not see the speakers for a long time after this, for its class in the school was far removed from them. But she held her fellow travellers in loving remembrance, hoping to meet with them again some day.

The next morning after her arrival, as she was admiring the pupils near her who seemed to be in her class, her eye fell upon one quite close that was wonderfully like herself in many ways. Upon inquiry she learned that it had been

brought down from British Columbia, and was, no doubt, a blood relative of hers. This caused her heart to grow lighter, a feeling of contentment stole over her, and she began to enjoy her beautiful situation more and more.

When she put her mind upon her advancement she learned many things about herself and her family that had never reached her in the open, for gossip is not common there as it is in the thickly settled places.

An English visitor to the school coming upon her one day exclaimed to the teacher: "Why, you have here our flowering currant. We prize it highly in Europe as an ornamental shrub on account of its bright, graceful blooms. What are you doing with it?"

"You probably know that it is a native of the Pacific coast," said Burbank. "I hope to persuade it to leave off its bad habits of bitterness and seedy little pulp and train it to grow good, sweet, luscious fruit for your tarts and jellies. It will then become useful to you as well as ornamental."

Little Hopeful was listening, and you should have seen the long clusters of bright pink flowers with which she decked her clear, brilliant green foliage. Every one stopped to admire her, and some one exclaimed: "How refreshing this dear little thing is in her native grace! Her simple ways are so charming, and what a delightful perfume!"

Now, there were in the primary near at hand, a number

of little pupils grown from the seeds of the currant from British Columbia, some of which showed great promise. Their foliage was fine, and their deep pink—almost scarlet—blossoms were very attractive. Many of the flowers were larger, and there were a greater number of blossoms in a cluster than their parent had produced.

The teacher came one morning with some yellow dust, which was given him by one of the little Britishers, and placed it upon Hopeful's bright bloom, telling her to nourish it, and to make a great big effort to throw off her bitterness and to become juicy and sweet.

She heard a whisper as the pollen touched her stigma. It said, "Wake up and grow." Then she realized that she was learning her lesson. She had never had any one take an interest in her before, and no one had seemed to care whether she advanced or not.

The next season little pupils of her own were blooming all around her, and as she compared them with the others she had seen, it appeared to her that many of them were in every way superior. She was sure she was right when she saw the master placing tags upon some of them. And again, when he came at fruiting time, he selected those that had long clusters of fat, ripe fruit. By the way he looked when he tasted them she knew her longing was to be satisfied.

Another year passed and the seeds from the chosen ones were planted in large numbers. Selections were in time

made from these, and a few proved worthy to be promoted for higher culture in flavor and lusciousness.

A new kind of currant is soon to go out from the plant school. It promises to have a finer perfume than any of its kind and it is quite hardy. Burbank is extremely careful never to present to the world any production unless it is equal in all points, and superior in some way to anything of the kind ever before produced. So when he shall present this new currant—Hopeful, in her graduation gown—she will make quite a stir in the currant world, you may be sure, for she has learned well her lesson of obedience, and made good in the plant school.

CHAPTER XXVII

THE EARLIEST GRAPE

The great vines of wild grapes clinging to the trees and swaying in the wind were no doubt enjoyed by the little Indian boys and girls of North America hundreds of years ago with the same pleasure that the white children to-day feel when vacation time brings camping by the river's bank and swinging on the hanging grapevines.

The beauty of the grape has been sung for ages. Even Greek mythology is enriched by stories of the vine. Through cultivation the fruit was improved and developed by the ancients until it early became renowned in the Far East.

One would think that the grape, being so old, would not need further training, but plant pupils of all kinds are admitted to the school.

As a child Luther Burbank learned to love the grape, as he did many other plants, not for the fruit alone, but for the grace of vine, delicacy of tendril, and beauty of leaf.

Clinging close to the south wall of his father's house in Massachusetts was a vine of Isabella grapes. From the time it was planted Luther watched it and studied its growth. He learned that the buds appeared in early spring, then the leaves, after them the blossoms, and finally,

if sly Jack Frost found the south side of the house too warm for his icy fingers, large bunches of purple grapes were gathered, and some were carefully placed in a cool,



California grape.

dry room, where they remained as fresh as the apples of the orchard into the early spring months.

When Burbank came to California this friend of his childhood was not forgotten. He studied grapes grown on the coast, but found few among them which had come from New England. Many varieties from Europe and Asia were raised, and the Missions brought to the State

by the early Mission fathers were found on almost every homestead. The grape industry flourished throughout the beautiful valley wherein the scientist chose his home.



One of the new seedling grapes.

In the plant school seeds were planted from Western and Eastern grapes as well as from numerous wild varieties of South America and China; but none worthy of graduation were produced, although thousands were raised.

Peculiar and as yet unexplained conditions often occur in plant growth. In Santa Clara valley among an acreage of Isabella grapes one vine was found on which was a branch of extraordinary size and great rapidity of growth.

This branch bore leaves unusual in size and grapes much larger than those on the surrounding branches or vines. The berry was also superior in quality to the others.

This new grape, which Nature caused to spring from the Isabella vine, was properly named "Pierce," from the man on whose farm the grape originated. Burbank procured some cuttings from the Pierce and raised some fruit for the purpose of getting seeds of this new bud variation. Among the very numerous seedlings all had some faint resemblance to the Isabella in both vine and fruit, but there were peculiar traits among them also.

On some of the vines the bunches were long and slender; on others they were short and thick. The berries varied in size, color, flavor, and time of ripening. Some were large and luscious, others were small, sour, and seedy. The colors were white, light cream, amber, and rich royal purple.

There was as great a variety of leaves as of fruit; on some vines the leaves were small and shaped like the English ivy leaf; on others unusually large and of different forms.

Among these many peculiar seedlings about a half-dozen bear yellowish-white fruit. One kind has a delightful aroma, and a flavor not found in any other grape; more like the European varieties than the Isabella, but much finer in quality. Another, an extremely late and unusually large grape, is very delicious, and in the mild cli-

mate of California it will keep on the vines until Christmas and New Year, if protected from heavy rains.

Thus we see how strangely plants vary when taken under training and grown from seed. From this experiment by selection alone, one of the earliest grapes ever known is produced, and also one of the latest.

"This is not a wine grape," said Luther Burbank, when asked if any of the new varieties excelled as a wine product. Then looking at the questioner with eyes full of thoughtful emotion, as if penetrating far into the future, he added: "The continued use of wine destroys the finer qualities of both body and mind. Tell the children I have never produced a superior wine grape, and that if I ever do produce one, it shall be at once destroyed. No wine grape will ever be sent into the world from my plant school."

CHAPTER XXVIII

OPUNTIA, THE CACTUS CHILD

There was a smile on the fruit, and a smile on the flowers, and a suppressed titter ran through the chestnuts when Opuntia, the cactus child, came into school. He was so very green and such a homely fellow to look upon that it must have been hard for them to keep their faces straight. But most of the plant children had long since caught the

spirit of the school, and learned to know that appearances do not count for everything, and that nothing is entirely useless.

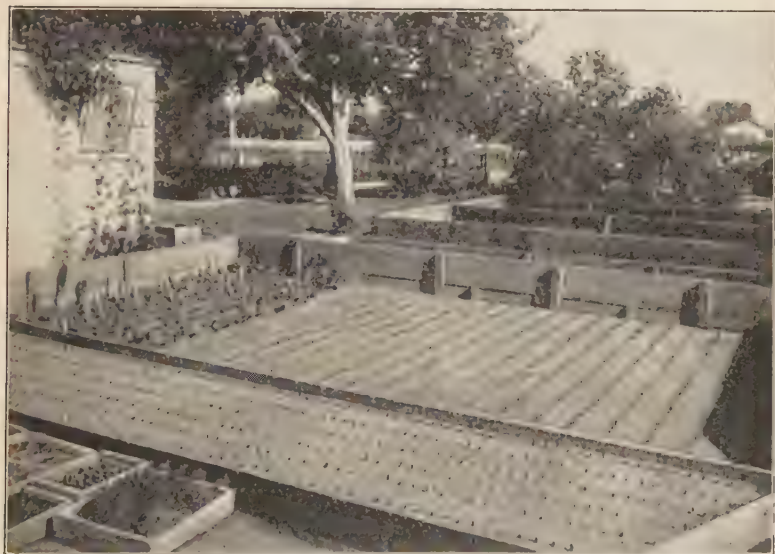
So, instead of passing this odd little urchin coldly by, they greeted him kindly and showed a willingness to have him one of them in all things. Plants, you must know, are sociable in their dispositions, and are often more or less dependent one upon another. They are seldom quarrelsome, and most of them live peacefully together, for it is their nature to be cheerful and happy. That is why they add so much to our happiness.

Of course the school plants were anxious to know where *Opuntia* came from and something of his family history, for plant children are much like other children in this respect. To know them you must know something of their ancestors. Then, too, the school plants were anxious to know about the training he was going to take to fit him for his life-work. They were all there for improvement, to be helped, and to help others. No place in the plant school for the lazy!

Opuntia was very clumsy and awkward among so many graceful children, and feared lest he should injure some one with the sharp thorns he was compelled to wear in his old home as an armor of defense. So he drew back a little, and this made him appear timid. He felt the gaze of all eyes upon him, and that made him nervous, as it would any one.

"Oh," he thought, "if they would not look at me so I should feel lots better."

But so many disagreeable things had come to him in his lean little life upon the desert that he soon recovered



Baby cactus in boxes and hotbeds.

from his embarrassment and forgot himself in the beauties about him. What a contrast to the poor dwarfed hungry ones with whom he had always associated were these well-fed, beautifully clothed plant children!

When *Opuntia* became better acquainted, however, he felt more at ease, and soon he talked freely with his new

companions, and finally told them his story, as his old grandfather had often told it to him and his little prickly companions.

"I have many relatives in America," he began, "and several in other lands whom I have never seen. Some call us 'prickly pear,' because of our needles and our pear-like fruit; but our real name is *Opuntia*. Our blooms are either red, yellow, or purple, and, unlike our bodies, they are very frail and beautiful.

"We had leaves once, as well as you," he informed them, "and were as thornless as Gold Ridge apple over there."

"Impossible!" came from the plant pupils on every side.

"Oh, no. I am quite sure it is true, for grandfather told me. When I tell you how it came about that we lost them, you can see for yourselves I am right.

"See these little leaflets I wear still, where the old true leaves used to be."

The cactus child was greatly strengthened by the nourishing food given him in such liberal quantities, and his spirit was rising.

"Long, long ago," he went on, "our people were stranded in a place where they had to hustle alone. They tried to help each other, but it seemed no use, and they became helpless and hopeless. The less hardy ones perished. The water gradually dried up as fine sand drifted in and filled

the low meadow that was once our beautiful home, and which in ages past had been an inland sea. Then our people talked the matter over, and it was the opinion of the wisest ones that, in order to keep any moisture at all in their bodies, they must have smaller leaves or drop their leaves entirely. In this way there would be less surface for the hot sun and scorching winds to draw it out. They had to learn this, of course, from Mother Nature. And, do you know, I heard the master say the other day, 'Nature never lies.'

"As the years went by, my people's home became dryer and dryer; gradually the water disappeared, and finally it was a desert. Then a still greater struggle began. Leaf after leaf was dropped, until all were gone and thick stems alone remained. The sun grew hotter and hotter. It became more and more difficult to get food from the dry plain, and the thirsty and hungry animals tormented them constantly.

"Finally a great convention was called to discuss the sad condition, for no one had come to rescue them or to offer help of any kind. It was decided then and there to grow thorns with which to protect themselves, for without some means of defense, even after shedding their leaves, they would be driven from off the earth. Mother Nature, the friend of every living thing in the world, had already told them that this was their only hope, now that they were so hard pressed, and they believed her.

"They grew sharp, needlelike thorns at first and placed them at just the right angles to ward off meddlesome tongues and teeth. They also placed bundles of very tiny needles, more than ten thousand to each stem, below and at the surface, where they were partially embedded in the flesh. These were even more dangerous to animals than were the larger needles, for they not only produced great pain and inflammation, but often caused death to the animals who ate the stems for food.

"Wearing thorns had a tendency to change the disposition of my forefathers. They took on a fighting spirit, and much of their former sweetness left them."

Opuntia's tone grew serious, as he added, "Oh, if I could only be as beautiful and useful as my people once were!"

"No plant child can long remain here without becoming both beautiful and useful," spoke the once bitter elderberry, that had been a long time in training, but was now white and delicious as a grape.

"We know that," came from a passion flower over the way, as she waved her arms and nodded her starry crown. "We know that; see the fine fruit we shall soon offer to the world."

The master came on his regular round to note what the dear plant children had accomplished, and they all turned to smile upon him, leaving the cactus child alone and thoughtful.



Cactus in training.

CHAPTER XXIX

OPUNTIA'S TRAINING

The master of the plant school saw what a great work could be done to reclaim the desert regions of the earth if he could but rid *Opuntia* of thorns and prickles. The vast dry plains, now barren and useless, would yield a new food for both man and beast, for the cactus is nearly all food and drink. Burbank's quick eye saw beneath the rough exterior, behind the thorns, a tender heart, and not only

a tender but a juicy one as well. And, although *Opuntia*, the cactus child, stood there before him with his needles thrust out defiantly in every direction, seeming to say, "Touch me, if you dare!" the master knew that this unfriendly child possessed many good qualities, which recommended him for training in the plant school.

Opuntia had a strong, hardy constitution and grew rapidly. He did not shrink from the blistering sun, like most plant children. He could thrive on any soil, for he was used to small rations, and he did not care in the least if his home was changed from the barren plain where he was so hunted, for animals, both small and large, sought him there eagerly, though the thorns often pierced them severely.

Opuntia, thought the wise one, will doubtless prove a stubborn child and need strict training. It will require a steady hand to guide him, and great patience will need to be exercised for years and years. But no matter about that. No matter how wild or defiant a plant seemed, if Burbank saw in it something good and useful, the pupil was received even joyously, as in this case, into the school.

Luther Burbank had long been acquainted with many varieties of the cactus. Indeed, as a little child, when he first began to toddle, a lobster cactus in a little pot was his plaything. He hugged the treasure close and carried it carefully; but one day he stumbled and fell, breaking both pot and plant. You can well imagine how sorry he felt.

Who can say but that this first love of the plant was the beginning of the great work with *Opuntias* he was to do in the world—the child love for that little cactus plant.

The great work of training the cactus child began in earnest when the master brought *Opuntia* from Mexico. First the cactus thorns must be gotten rid of, for no other advancement would fit *Opuntia* for usefulness as long¹ as he wore them. So the master gave the cactus child to understand that he would look much better and become more useful and lovable if he would drop those ugly thorns and put on a civilized suit of clothes, and, furthermore, that he would save himself the great effort which he had to make to produce those thorns. He taught *Opuntia* that obedience would bring him into a beautiful life, and promised all the help and care needed. He assured the plant child that nothing should harm him, and that good, nourishing food would be his in abundance. Plants, as well as human beings, know when we are kind to them, and little *Opuntia* felt all this kind-hearted attention of the teacher.

Soon many of *Opuntia's* relations were brought in to aid in the great plan of improvement for the cactus child. *Opuntia* was greatly pleased, but when they tried to become acquainted, he was somewhat confused, for there was talking in so many languages. Some had come from Africa, some from Hawaii, others from Japan, Australia, and the South Sea Islands, while there were those from France, Sicily, Italy, and from many parts of the United States.

Thousands were in one plot in rows only a few inches apart.

One thing that especially caused *Opuntia* to wonder was that he had fewer thorns than they, and he could not understand, as yet, how they could assist him in improvement. But later on he learned that each one possessed some good quality that was needed in his development for usefulness. One was more hardy than he, one produced more and better fruit, another had less of the tough fibre and more flesh, and so on.

A few of them had already been quite useful. A neighbor of his from Mexico served as a home for the cochineal bug, which, when dried, makes a famous red dye. One from Italy produced a fruit known as the Indian fig, which was relished by many as a food. Others were used in Australia, Mexico, and in the southern part of the United States as a food for cattle, after singeing off the thorns.

When this great company of cactus people blossomed, the work of pollination, or crossing them, began. This must be done in order to combine good qualities, to break up old habits, and to produce variation. It was then that little *Opuntia*, the cactus child from Mexico, who was now growing thriftily, came into fullest notice, for he was to have special aid in his advancement.

The cactus differs greatly from other plants. Its flowers are in full bloom only from one-half to two and one-half hours in the hottest time of the day, during the hottest

summer months. All arrangements for pollination must be ready when the blossoms first open and wave their bright banners, and breathe their perfume to attract the bee or some other pollen-carrier, for no trace of pollen carried otherwise than by the master must be on the flower before the pollen be selected and applied to it. The work, therefore, demands careful preparation and haste.

In gathering the golden dust from *Opuntia's* blossoms and placing it upon the stigmas of the other cactus flowers, the teacher's fingers were often pierced by the sharp needles, and the tiny ones sometimes worked their way into the flesh, causing great pain. Every step in combining the thousands of plants must be carefully guarded. Only skilled workmen could aid in this, so the master endured the ordeal year after year, during all the time he was training the cactus child.

Most of the baby cacti grown from the seeds thus fertilized showed great stubbornness in their old habits of growing thorns and needles. Thousands showed no improvement. Some were even more defiant, bearing uglier thorns and more of them. A small number showed a great change by producing fewer spines or needles. These were placed by themselves. They alone had obeyed the master's instructions and would be allowed to go on to still higher advancement.

Year after year, for nearly ten years, this selection went on; sometimes only one out of ten thousand was saved. At last there were seven or eight of all the thousands which

had been in the school that were not only free from thorns but had the growing and feeding qualities for which he had so long striven. They were children no longer now, but



Cactus fruit.

giant cacti, as tall as full-grown men. Their leaves were from ten to twenty inches long, from six to twelve inches wide, and from one to two inches thick, and bearing delicious fruit. There was not a spine or a needle in all their rich

meat. The woody fibre had partly disappeared and the surface was as smooth as a watermelon.

Little *Opuntia*, the cactus child, was justly proud of these finely developed plant children, who were on the honor roll, and were now ready to go on to a higher education for usefulness.

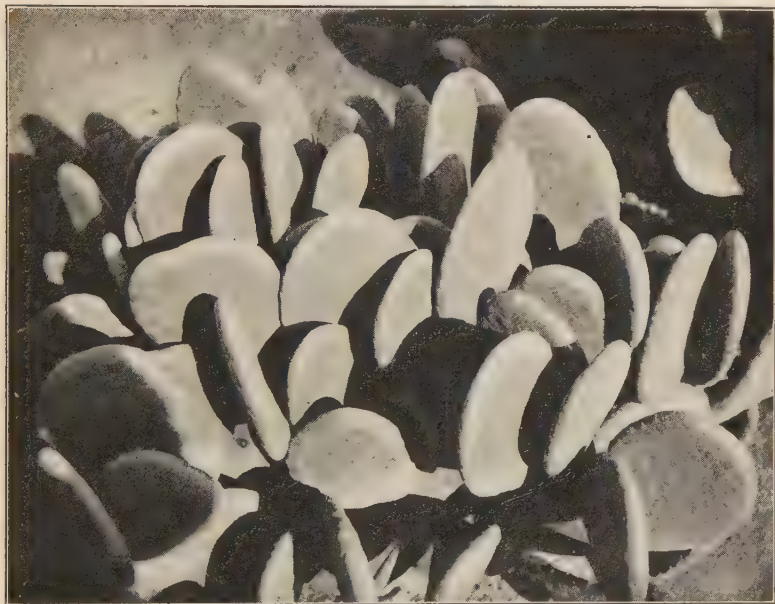
CHAPTER XXX

OPUNTIA, ONE OF THE MOST FAMOUS PUPILS

Just as all eyes of the plant pupils were turned upon the cactus child when he entered the school, so are the eyes of real people now centred upon its offspring, the

spineless edible cactus, which is among the greatest, the most wonderful, and the most useful of all Burbank's plant children.

Sixteen years crowded with patience, endless patience;



Spineless cactus

and waiting, anxious waiting! No one but a genius with deep faith could have accomplished this great task. No one has ever equalled it in plant improvement.

Not only are agriculturists everywhere interested in these useful plants, but governments of all countries, where

they can be grown, are taking measures to secure supplies of stock to provide against the possibility of all too frequent famines. For they can be planted and remain uncultivated and undisturbed, constantly increasing in size and weight, until needed; then each acre would preserve the lives of hundreds of animals or even human beings for months, until other food could be obtained. No class of plants is easier grown. Quality of soil is of little importance. Cultivation is almost or quite unnecessary.

The old prickly pears produced as much as eighteen thousand pounds of fruit to the acre, and this was a common crop on the poorest soil. The best of the new *Opuntias* will sometimes produce more than one hundred eighty thousand pounds of delicious fruit on the same space. It is the only forage* plant that furnishes such an abundance of juicy, green feed the year round. Its big leaves can be cut at any time, summer or winter, and they furnish water as well as food. This is why intelligent people know that a new era of agriculture has dawned for continents like Australia and Africa, and for millions of the now useless acres in other countries.

Remember these spineless edible cacti are new plants—wholly new—the product of the brain and hand of Luther Burbank. Partially thorny ones have been grown for ages and cultivated for their fruit. But systematic training in

* Forage—food for horses or cattle.



SPINELESS CACTUS SLAB
With fruit in stages of ripening

the plant school shows how rapidly they improve under cultivation and how readily they adapt themselves to more fertile soils. Plant children are, indeed, like other children in this respect.

"But won't they run wild and grow thorns again if they are planted on desert land?" asks one.

"Oh, no!" says Burbank; "their character is fixed by continued selection, as the characters of other new plants have been fixed. The little plants must, of course, have cattle kept from them until they are large enough just the same as any young plant must be protected."

If turned loose on the desert to grow wild, perhaps, in defending themselves as their most ancient ancestors did, they might in a thousand years of fighting, grow spines again, but never while under the cultivation of man.

As children differ in their talents, so *Opuntia's* people vary in usefulness. Some are good for their fruit, others for forage, while some are useful for both. The greatest usefulness, perhaps, and one that cannot now be fully appreciated in its far-reaching benefits, is that of forage for all kinds of cattle and poultry, and especially for cows. The increase in both quality and quantity of milk is very marked when *Opuntia* has been fed. It promises now to become one of the most important food producers of the age, and yet the work with it has only begun. If you should visit the plant school, you would see thousands growing under the watchful care of the teacher for further develop-

ment, and several years will yet pass before they are ready for graduation.

The fruit is very unique and attractive in appearance, and its flavor is rich, suggestive of the banana, the pineapple, or the apricot. It is delicious when, standing by the plants, it is eaten from the hand, or when served with sugar and cream, as a dessert at meal time. It is also used as a salad, and may be baked as you bake bananas. It ranges in color, both skin and flesh, from almost white to deepest crimson. Some kinds are a light greenish with a crimson flush, while others are a deep orange, almost an amber. The general way of preparing the fruit for use is to rub it off with a whisk broom, cut a thin slice from each end and run the knife through the skin from end to end. You can then curl the skin back easily, leaving the sweet flesh ready for use. Or one may cut through the fruit from end to end and remove the flesh with a spoon. *Opuntia's* fruit is very wholesome and keeps well. It can be gathered and stored like apples.

Perhaps you have eaten candy colored with this fruit, or ices colored with it, for these are among its many uses, while the leaves furnish a mucilage which makes a whitewash more lasting, and the fibre is quite valuable for paper-making.

If you would like to grow some of these curious plant children in your garden, secure some cuttings in warm weather and lay them up to wilt for about a week. They will then root readily in any soil in a warm climate, for they

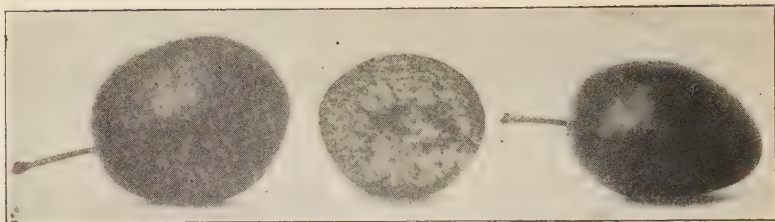


Fruiting spineless cactus.

just love to grow. Why, they would grow if you threw them down on the ground—even the blooms, buds, or fruit will take root under the most trying conditions.

You can have several varieties from the earliest to the latest, and have ripe fruit in your own garden from June to the last winter months. The leaves would feed your poultry, and there would be any amount of pleasure for you in watching their rapid growth.

You will remember that the cactus child longed to be useful and beautiful as were its forefathers in ancient times. Has it not realized its highest ambition?



Stoneless prunes.

CHAPTER XXXI

THE WAIF OF THE SCHOOL

Half-pit, a poor little French outcast, was allowed a home in some of the large gardens of France simply because he was a curiosity. Every other prune had his kernel covered with a hard shell or stone, but only about one-half of Half-pit's kernel was covered, and so he was called by his peculiar name. He was very small, no larger than a cherry, and very sour and bitter. Poor little Half-pit was never invited into a garden except to show his curious stone.

Now, the master of the plant school, who sees good in everything, admitted Half-pit to his school and gave him a place among the other plum pupils. But his fruit was so small and sour, his body and limbs so scraggy and crooked, that the master was very much discouraged at first.

Near Half-pit in the great plum-prune class stood "Ve-

suvius," famous for her beauty of dress—for her foliage, her great leaves being often four or five inches wide and six inches long. The colors of her gown were gorgeous, a beautiful dark red shading into light crimson and white.

Poor, scraggy Half-pit in crumpled green, leafy suit was in the same class with many other gayly clad pupils, but in a plant school there is never any fun-making or giggling when a poorly dressed pupil is admitted. Indeed, all the plums and prunes were very kind to the little French waif, and tried to make him feel comfortable. He could not remember the names of all his classmates, for there were so many of them, but he admired the strength of one, the straightness of another, and the sweetness of another, and hoped some day to grow like them.

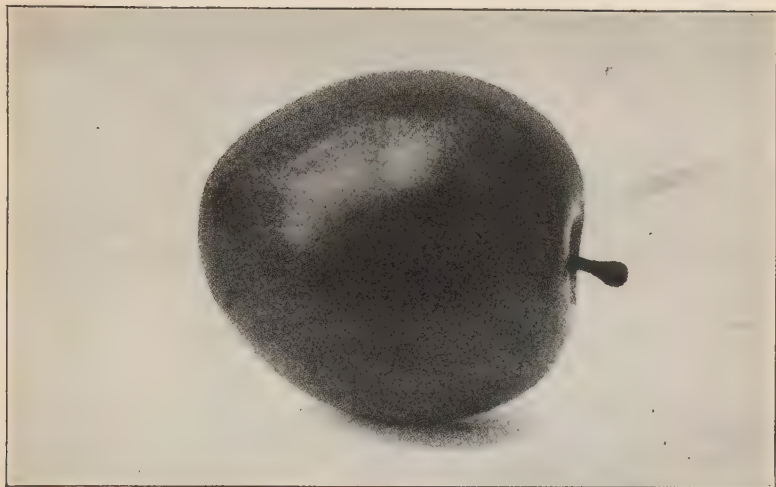
Yes, Half-pit longed to become straight and strong and sweet, and, most of all, to understand what it was the master wanted him to do. At last he realized that the odd little half-shell which he had tried so hard to keep was not necessary to him at all, and that he could be of more service to man if the half-shell were entirely gone. Half-pit did his very best, and about the fifth season after entering school many white blossoms appeared, and the wise teacher brought golden pollen from the French prune to combine it with that of Half-pit.

Soon little prunes that looked like gooseberries took the place of the snowy blossoms, and each day they became larger, brighter, and more beautiful.

The master was greatly pleased with Half-pit's efforts, but years of training were still necessary and thousands of seeds had to be planted. Other crosses were made; sometimes pollen from prunes, at other times pollen from plums, was used. Often the half-pits were larger than the first; indeed, many of the young trees bore fruit with entire pit covering. The best half-pits were saved for planting, although other qualities had to be considered when selecting seeds. The new fruit must be sweet, large, and juicy. As many as five thousand descendants of little Half-pit were often in the school at one time.

After twelve years of patient training, Conquest, the first pitless prune, appeared. Now, many varieties of prunes which have no hard stone are found in the plant school. There is, however, a tiny kernel in most of these prunes which adds a rich almond flavor to the fruit. This kernel looks somewhat like the seed of an apple. In some of the recent prunes there are left only small fragments, as if the kernel of an apple seed had been divided.

Scraggy, sour little Half-pit laughs now as he sees the surprised expression on the faces of great and wise men who visit the school and are given this new fruit, and asked to cut through its centre. Of course they expect to strike a pit, and they consider it a joke, but when the knife glides through the prune they adjust their spectacles and search for the stone that they think should be, but is not there.



Climax plum.

CHAPTER XXXII

THE CLIMAX PLUM

A good many years ago there came to the plant school two queer pupils. One, little Simoni, was a plum pupil from China; and the other, little Triflora, was a prune pupil from Japan. They were quite lonely at first, and felt strange, for everything was so different from anything they had ever been near before.

Simoni was a very funny little fellow, and produced fruit that, though spoken of as a plum, was shaped more

like a flat tomato, and was so bitter that it puckered one's mouth all up.

But the oddest thing about it was that it had almost no pollen at all on its anthers. It was hard to find even a few grains. Burbank had once found some, for you must know that he could find it if any one could. These few grains he used in creating the Delaware plum, one of the parents of the Bartlett plum.

Now the Bartlett plum is a very distinguished pupil, for it has the exact flavor of a delicious Bartlett pear. Indeed, to prove this, one of the foremost fruit men of the world was blindfolded and given some of the fruit to taste, and not knowing what kind of fruit he was eating, said, "It is the finest Bartlett pear I have ever tasted." It is also very attractive otherwise, having an upright, erect form, and beautiful, glossy, green leaves. The fruit is yellow, turning to deep crimson when fully ripe. It is firm and juicy, with salmon-colored flesh.

So the teacher saw the good in little Simoni, and knew that it would be of still further use in the world if properly trained.

Triflora was a more lovable child, with a much sweeter disposition; and felt better acquainted, for other pupils from Japan had been trained in the plant school. You know that children tell each other about their school days, and anything new that they have seen and enjoyed, so perhaps Triflora had heard more about it than Simoni had.

The other Japanese pupils had been very helpful in making many kinds of new plums of different sizes, colors, flavors, and qualities, that had gone out from the school to make the world richer and happier. There was quite a corner given to their improvement, for there were so many of them. Five hundred kinds had grown together on one big plum tree, at one time, and three hundred thousand were then in the school.

When March came all the plum trees were white with bloom, shedding their petals like snowflakes and filling the air with sweet odors. Simoni and Triflora waved their white blossoms, too, and gave out a delightful fragrance, doing all they could to show their gladness that spring was coming.

The teacher then came to give them aid. First he took out his microscope and examined Simoni's flowers. Yes, there were a few grains of pollen—a very few. He carefully gathered the anthers on a watch crystal and put them in a safe place to dry until the morrow.



A good little plum.

He was out early in the morning, when the bees began to hum, preparing the blossoms of Triflora to receive the precious grains of golden dust. When he had finished, and placed tags upon the fertilized blooms, he left them in the care of Mother Nature until the fruit should ripen. Their pits would then be labelled and saved for the next year's work in training.

When tiny plant pupils from these pits were growing happily, the master came again; this time to select the best. When he found one whose leaves were larger, smoother, or with a more even margin than the others, it received a badge of honor, for it would, he knew, bear a larger, sweeter, or firmer sort of plum.

The selected ones need not wait six or seven years to bear fruit. Oh, no. Skilful workmen took them from their little beds and tenderly placed them on the sturdy arms of a full-grown plum tree, so that they would have to wait only one or two years to bloom and bear fruit, saving much valuable time in their school life.

Among these little plant children of Simoni and Triflora were several that bore fruit of rare flavor. But there was one especially that would even fill a room with its delightful fragrance, like that of a pineapple. And when it was eaten, one could think of nothing but bananas, it was so delicious. Burbank was so elated with the qualities of this little child that he exclaimed, "This is the Climax!" And now it is known as the Climax plum everywhere, for it has

proven to be one of the finest shipping plums in the whole world. It is sometimes spoken of as the "king of plums," owing to its extreme earliness, and its immense sized fruit, which is heart-shaped, deep, dark red in color, with rich yellow flesh.

CHAPTER XXXIII

THE PLUMCOT

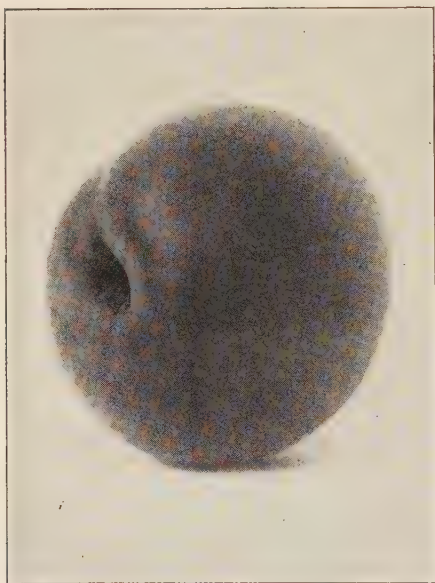
Standing at the head of the class of distinctively new fruits is a pupil of such renown that "All the world wonders." Men in high authority upon plant growth said: "No use to try." "It cannot be done." "A waste of time to experiment." "Such crosses have never been made, and never can be successful. Members of so widely differing species cannot be united."

These and many other discouraging messages reached the ear of the master of the plant school. Still, patiently he toiled on, and his reward is one of the greatest victories yet recorded in the field of horticulture. As a result of this perseverance Plumcot ranks first in the class of new products of the plant school, although many other new fruits and flowers have been given to the world.

Wishing, if possible, to develop an entirely new fruit, the master chose a plant pupil from Japan, for he has learned through years of experimentation that, in order to get results from cross-pollination, it is better sometimes that

plants come from widely distant countries. The Japanese plum had also many good qualities to recommend it.

On a bright morning in spring, when this stranger from



A tomato-shaped plumcot.

Japan was decked with white blossoms, the master came, bringing to many of these blossoms golden dust from one of his apricot trees. It was at this time that learned and wise men declared, "It cannot be done." Burbank said, "We will try."

You may be sure that all the fertilized blooms were watched, and, when the fruiting season arrived, seeds were saved for planting.

From the first the young trees varied greatly; some were more like the plum, others like the apricot. The leaves were also changed; they were larger than those of the plum, and in shape somewhat like those of the apricot. The character of the tree was greatly changed.

Although a promising pupil from the first, Plumcot has been under constant training ever since it came into exist-



A trio of plumcots.

ence. A great amount of care and expense has been bestowed upon it, yet never through all these years has the master lost faith in his experiment.

Tens of thousands of plumcots have been in school, and as a result of careful selection and training four large classes have been graduated and a delicious new fruit has been added to the food of the world.

The first graduate was "Rutland." The tree resembles the weeping willow. Its long, swinging branches, thickly set with bright green leaves, form graceful arches overhead.

When the fruit is fully ripe its deep purple, velvety skin adds new beauty to the tree. The color of the flesh of the Rutland plumcot is a brilliant red. In size its fruit excels its near relative, the plum.

"Apex" is a later and far superior graduate. In this the tree is somewhat like the plum but the fruit is almost as round as a ball. Its skin is a rosy pink, but the flesh is a bright yellow. Apex is a freestone, while Rutland's sour, juicy meat clings closely to the stone as does that of a cling-stone peach.

A third to be graduated is the "Triumph." This tree resembles the Rutland, but the fruit is apricotlike and has a purple skin dotted with scarlet. The flesh is a deep crimson.

The fourth of the plumcot class to receive a diploma is the "Corona." This is as large as most apricots, is golden yellow with pink cheeks, and the flesh is yellow.

All have distinct and unique flavors—a combination of the plum and apricot, yet unlike either. Each new variety brings new flavors, and although those that have been sent out are delicious, those that are almost ready to leave the school surpass in size, flavor, and abundance the first varieties.

Now that the success of the unusual experiment is fully assured, let each boy and girl who reads these stories be more firmly convinced that

"They can conquer who believe they can."



THE RUTLAND PLUMCOT

CHAPTER XXXIV

THE ENNOBLING OF LITTLE BEACH

Like most wild plants, the Beach plum family had a hard, fierce struggle for existence, and its energies were taxed to the utmost. Some of them even had to grow thorns for protection, and others had to crowd together in thickets so close that it was hard to find an opening between them.

The eastern part of the United States was its home. It was called "Little Beach" there, because it lived near the shore that was sometimes submerged by the sea. It was also found on dry, rocky soils as well; yet it managed to live and bear fruit under the most trying conditions.

The fruit which it produced was no larger than a cherry, and was mostly pit, there being only a thin layer of flesh between the pit and the skin.

The ambition of this little, lean, skinny outcast was to be made tame, and to be better fed, so that it could grow to be plump and fat.

All that it seemed to have to recommend it was hardiness, and all it could do was to yield an abundant crop in the most trying time of cold or drought. Even though its fruit was almost worthless, it would show its willingness to be useful by doing its best.

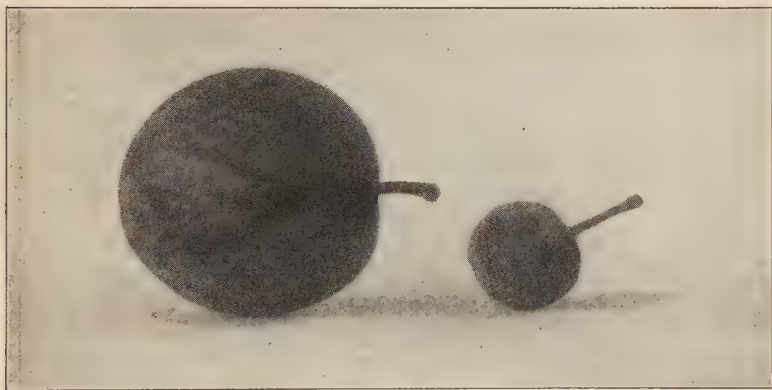
Through all the years of work in his plant school, Bur-

bank had gone out into the open—in the mountain, valley, and forest—and sought out the little wildings that longed for a more favorable place for growth and development, and brought them in for training. His sympathetic heart went out to them, and he knew which would respond readily to cultivation. Indeed, when only a boy, he sympathized with weeds, and wondered if he might not be able to improve them. He said: "Weeds are weeds because they are jostled, crowded, cropped, and tramped upon, scorched by fierce heat, starved, or perhaps suffering from cold, wet feet, tormented by insect pests, or lack of nourishing food and sunshine. Weeds are plants out of place."

He seemed always to know which would prove grateful and be willing to help the other pupils in the school. He saw in this hardy little savage an unselfish nature, and immediately set about preparing for its improvement and usefulness.

When Little Beach arrived at the plant school he was greatly surprised at the cordial welcome he received. The plum pupils and the prune pupils were especially glad to see him. Even the most aristocratic ones offered their hands and smiled upon him. He admired their upright carriage, their fine glossy leaves, and later on their lovely white blossoms. He hoped that some time he would look as grand as they, but he could not quite understand why his blooms were not out.

Then he heard the teacher say something about the other pupils minding the frost, and that it kept them from bearing fruit in many places. He began then and there to feel his importance, for he knew all about how to resist



The ennobling of the Beach plum.

the cold. He had had experience with the cold, and he began to realize how he was going to be of use by teaching them new ways, while he was also receiving instruction from the master.

A month later Little Beach was a perfect snowball of bloom, when the Japanese plums and others had lost nearly all their beautiful white petals.

Then came the wise one to admire Little Beach's flowers, and also to impart to him the knowledge of his real worth, and to tell him what was expected of him in the future.

From a few belated blooms of the Japanese plums some pollen had been dried, and great care had been taken to preserve it. He now placed this pollen upon the stigma



One of the "Little Beaches" that bears some.

of the choicest of Little Beach's blossoms, and tagged them until fruit should ripen.

The next season the plant pupils from these seeds made fine progress, and when large enough were placed upon the arms of a full-grown plum tree, along with the pupils of more distinguished ancestors, in the Gold Ridge grounds.

Two years from that time the first generation bore fruit, which showed such great improvement that Bur-

bank knew there was a great future for Little Beach; but further crossing, or pollination, must be done, and he must continue to cultivate patience, which this restless little fellow needed.

Little Beach rejoiced, I am sure, when the fine plum pupils of the third generation appeared, for they were beauties to look upon, their fruit being large and very delicious. Many of them wore lovely bright colors—red, pink, and yellow—and one was clothed in a rich royal purple flecked with white. None of these showed a trace of bitterness in the rich meat. And such plump, round bodies they had! Not one of them was a bit flattened, and none had the creases that other plums have. To his delight, and to the delight of his teacher, they had erect forms and beautiful, glossy leaves, and were possessed of a fine constitution. They would be sure to prove a blessing, especially to those who could not before enjoy the luscious plum because of a cold climate. He had now made it possible for the plum family, with its higher education, to grow everywhere.

Little Beach is considered a great hero in the plant school, and has become famous, for he has been adopted so that he may remain there permanently, and be of still greater use in the world.

CHAPTER XXXV

CHERRIES

One often wonders how the teacher of the plant school was able to make such a wonderful change in the cherry. The plump Royal Ann, as she is now, with her blushing

pink cheek is admired by every lover of nature, as she gracefully hangs from her slender stems, or peeps from beneath her canopy of green leaves. During the months of May and June she seems perfect. When one visits an orchard of these trees and is permitted to taste the fruit, further improvement seems hardly possible.

The Black Tartarian, also when fully ripe, is delicious. It is so sweet and juicy when first taken from the tree, one wonders how it could be made better, but the master, in his vision, sees cherries far superior to any yet produced.

The first cherry pupil was the purple Guigne, noted for its earliness. The teacher wished it to become still larger, earlier, sweeter, and more productive. Even a day's difference in the ripening of the cherry crop means much to the California producer, for the first fruits of the season are shipped East and bring high prices.

So the work was begun. Thousands of pits were saved from the Guigne, and soon the kindergarten was full of young cherry pupils. All the best were later promoted to Gold Ridge. They were grafted onto large, strong trees, many hundreds being put on each tree. From the best of these, seeds were saved and other trees were grown. The process of selection in this case was a long one, and continued for many years before the first cherry pupil was graduated. This tree was sold, and the proud purchasers named it "The Burbank Cherry" in honor of the master.

The new tree is vigorous and never fails to produce large

quantities of luscious fruit. The leaves are large and grow so close together that the plump black cherries are well protected from the birds. When it rains, this heavy foli-



The Burbank Cherry.

age serves also as an umbrella to the fruit and keeps it from cracking.

The Royal Ann, before mentioned as being so nearly perfect, was early admitted to the school. This distinguished pupil is of French origin. It has been a favorite for a hundred years or more. Its correct name is "Napoleon," although in the West it is commonly called the Royal Ann.

The Napoleon has a few faults. When its rosy cheeks are washed by a May shower its skin cracks; this spoils its beauty and usefulness. Sometimes the tree fails to bear,

at other times the crop is very light, but by many people these faults are overlooked, and it is still called the Royal cherry.

As usual, when Burbank began to train the Napoleon, many, many thousands of pits were planted, and for years the class received constant care, and selection of the best was made from year to year, until finally a descendant of this time-honored cherry was graduated.

The graduate is far rosier than its noted great-grand-parent, its skin is much darker, its flesh is sweeter, a shower does not harm it, and it has never been known to fail to produce a good crop. This cherry has been given the very appropriate name "Abundance."

The "Giant" is another member of the cherry class. Its training, too, has been long and severe. Its distant relative is the Black Tartarian, but its education has fitted it for greater usefulness than the Tartarian. The tree excels the Tartarian in productiveness. The fruit is of superior size, quality, and flavor. Eleven of these new cherries lying side by side measure twelve and one-half inches. Four or five weigh one ounce. The skin is black and glossy, the flesh is dark and luscious, the tree is strong, upright, and a rapid grower.

One might think that the master should be content having so many cherry graduates, but he is not. Very little has ever been done before to improve the cherry. That it can be developed almost beyond imagination has

been shown by the results of work already accomplished. There are at present nearly a thousand varieties of cherries in the plant school. There is one tree with over two hundred varieties grafted upon it. In the bearing season some will be ripe while others are yet forming, and there are all gradations between these extremes. Some cherries are small but exceedingly sweet, and some are very sour. Some have the flavor of grapes, others taste like the apple, and many are far better than the older kinds. There are also peculiar shapes—one is long and pointed, another apple-shaped, some look like small plums.

Two of the new cherries are still earlier than the "Burbank," but many ripen very late. Some are exceedingly productive and give promise of being the best of shipping and canning cherries. There are cherries in training that have never failed to bear fruit, and have never been known to crack even after a hard rain.

The instructor in the plant school says: "Tell the children we are going to get them some better and larger and sweeter cherries than any they have ever yet seen, but this will take a long time and a great deal of work; still we will keep trying until we succeed."

Just think of the time when we shall have cherries as large as big plums; so large that we shall cut them in two to can them, as we do peaches. And then we shall also have many different kinds. Some will ripen early and others very late, and some will grow and bear in a cold climate.

CHAPTER XXXVI

USEFUL AND BEAUTIFUL

Two little pupils from Japan once came to the plant school. Very distinguished they were, for they were sent from the garden of the Mikado. They were already of considerable worth, else they would not have had so famous a home in the Far East. Indeed, they were greatly admired by children of Japan, for every year during blossom festivals they gave delight to many kimona-clad maidens who revelled in showers of white and rose-colored petals from their blossoms. For one of these fruit pupils had chosen white as its spring decoration, while the other, each season, was dressed in brilliant red.

We are sure that they were not lonely in their new home, they had so many friends and neighbors; many of these were from their native land, but many more were from other parts of the world. There was the edible ash being trained to discard its bitter puckery character and become more useful.

Corns from South America, Mexico, and Japan formed a very large class, and attracted the attention of all visitors. One with long, ribbonlike blades striped with rainbow colors added grace and beauty to the garden. The master was training this to grow larger and to keep its colored stripes of rose, purple, green, and cream of uniform width.

A queer experiment with Indian corn was witnessed by the Japanese pupils. It is called Indian corn, but even before the Indians inhabited North America the corn had begun its upward march toward perfection. It did not always have the full, compact ears of plump kernels we now see; centuries had passed in its development. The master decided to have it retrace its steps, to go backward to what it was before the Indians came, thinking that he might gain some knowledge by which he could train it for greater usefulness. The backward steps were taken in a few years, so, in the plant school, corn in all stages of development may be seen, from wild, grasslike corns to the best cultivated kinds.

And the plant pupils heard the story of little Prince Artichoke, who, robed in purple and green, came to the plant school direct from the gardens of the King of Italy. When he reached America he found that here his most numerous relatives were the despised and neglected thistles growing by the wayside and in the fence corners, although in southern Europe the artichoke grew in abundance in the gardens of both rich and poor and was highly prized as an article of food. It was served, not as a vegetable alone, but in salads, soups, and many other ways; and the hearts of the tiny buds preserved in oils, called baby artichokes, are thought a great delicacy.

But in America the real artichoke was little known or appreciated, so the mission of this little foreigner was to

make his kind an important article of food. This he had largely accomplished before the Japanese pupils arrived, for from the plant school had already been graduated an artichoke of very superior size and quality and with great deep sky-blue blossoms that were very ornamental.

They saw curious, odd-shaped fruits of different colors, produced by grafting a potato vine onto a tomato vine. They learned that it was only one of very many of the master's experiments, one easily effected, as the potato and tomato are nearly related plants, but the aerial potatoes which grew on the vine were of no special value.

They saw also experiments with grasses, grains, wild flowers, weeds of various kinds, peas, beans, eggplants, carrots, and so many more that the little strangers felt no longer strange.

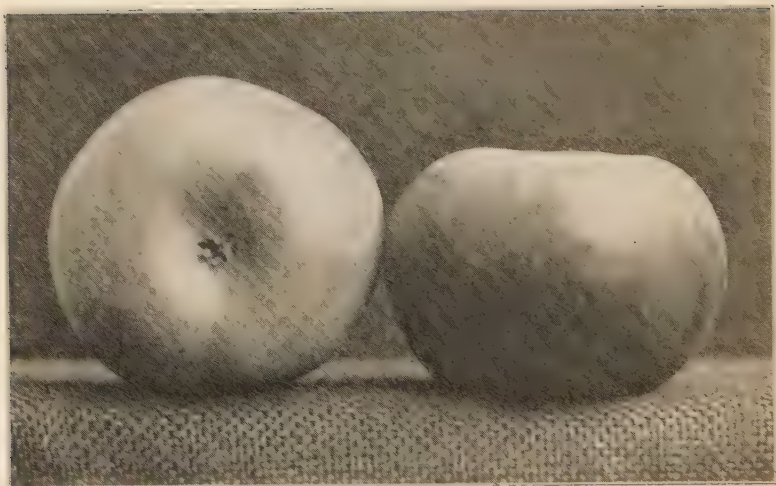
One experiment which to them seemed very sad in its results was that with a delicate border plant. It came to school to be made larger, stronger, and more nearly perfect. It was called "*Mesembryanthemum*." It had been in training for four years and had learned to produce a profusion of white flowers, its foliage was larger, and it seemed stronger. The master had these plants in various parts of the garden and in the conservatory, but from some unknown cause each plant suddenly died. Thus this new flower was lost to the world and the work of the teacher unrewarded.

Yet the Japanese pupils were not discouraged; they had

been sent to be trained for further usefulness, and when they saw the improved peach pupils, with their large, delicious fruit, they surely had faith in the teacher. But the master knew he had a difficult task, for the ancestors of these foreign trees had never produced peaches of value. For hundreds of years they had been grown in their native land for the beauty of blossom and foliage. The fruit they bore had a rough pit, and was small, tasteless, or bitter.

It was many years before the master succeeded in training the Japanese trees to bear, but at last it was accomplished by pollination and selection. All Japanese peaches are subject to a disease called curl-leaf. These flowering peaches were crossed with the productive sweet Muir, which is not greatly troubled with the disease. After a long series of selections a tree was raised which grows six times as fast as the flowering peach, and when spring comes it is wreathed with extremely large double blossoms of brilliant rose pink. These blossoms are nearly three inches across. When the tree is in full bloom it looks like a bower of roses, and when the fruit ripens it is of a superior quality, as large as the Muir, and an excellent canning peach.

Thus, as this stranger from the Mikado's garden has grown more useful, it also has become more beautiful, and another new fruit has been added to the long list of graduates from the plant school.



The Gold Ridge apple.

CHAPTER XXXVII

THE FIRESIDE FRUIT

When the apple decided to enter the school, it did not tell the master that it is one of Nature's oldest fruit children, and that the lessons it had learned would be hard to forget, or that the habits it had formed would be hard to break; but we are sure that he knew this, for it was one of the first friends of his childhood.

On his father's New England farm the frosts of spring often blighted the early blooming plum, pear, and peach: but the buds on the apple trees kept their cloaks folded

tightly until Jack Frost's reign was succeeded by warm sunshine. Then the delicate pink and white blossoms threw off the cloak of brown, and among the green foliage sang the robin, the wren, and the thrush on their return from winter homes in the tropics.

As the blossoms faded away and the tiny apples formed, then reddened, and finally acquired stripes of carmine and gold, the different varieties were closely watched and studied. It was he who discovered the first faint coloring of the Red June and Williams. He became acquainted with the names of the many kinds, for one of his early treasures was a book with pictures of the different fruits in outline. Many of these may now be seen in the same old book, shaded by irregular pencillings made by boyish fingers.

As some of the trees in the orchard bore inferior fruit, George, his older brother, decided to secure twigs or shoots from the best varieties of that time and graft the trees. Luther was then only five or six years of age, but he became interested in his brother's work. He could not understand why the fine large limbs of his favorite trees should be cut off. His brother explained that the little shoots would later bear better fruit than the larger and older branches. Luther saw that his brother made a small slit in a limb, then pried it open, and set in the tiny cutting from another tree. It seemed strange to him that the two would unite and become one, and that the fruit would

be the same as the graft or shoot. The little boy took great delight in watching the grafts grow, and after the third summer, when the grafted limbs began to bear, and the round juicy Baldwins ripened, while the ungrafted



Grafting fruit trees.

branches were filled with poor fruit, young Luther decided that grafting was surely of much use.

The harvest time was a joyous season when the Williams, Gilliflower, Baldwin, Greening, and Russet were each, in its turn, gathered in great baskets and stored in bins and barrels for winter's use, making the cellar rich with their fragrance.

For two weeks each fall the carpet of the large living room was removed, the ample fireplace opened, and on cranes were hung big brass kettles for boiling cider. Then, as the flames laughed and roared up the throat of the great chimney, the family, in quiet mirth, encircled the hearth, pared and quartered the apples for the winter's supply of cider apple sauce. The story of Johnny Apple-seed, the eccentric character who planted seeds of fruit trees in the wilds of the Ohio Valley, 1801-1847, and those of other heroes of early times, were often rehearsed. Many happy winter evenings were passed around the New England fireplace.

“The mug of cider simmered slow—
The apples sputtered in a row
And close at hand the basket stood
With nuts from brown October's wood.”

Here, no doubt, was formed the love for the apple which helped to give to the future scientist patience and skill to add to the already long list still other and better varieties of apples.

One of the first apple pupils was his old time friend, the Williams. The master of the school, wishing to develop the fruit, planted seeds from this apple, and as apple seedlings vary greatly, never coming true, there was a great variety of young tree pupils to train. All those giving promise of better fruit were grafted upon a large, strong

tree. In the arms of this were rocked seventy-five varieties of apples. When they ripened they were of many sizes, shapes, and colors: red, green, yellow, striped, splashed, and dotted. Some were inferior, others of especially fine quality.

They were exhibited at the Stanford University by Burbank, who was at that time a member of the faculty, and used to illustrate a lecture. They were afterward placed on exhibition at the San Francisco ferry building.

Burbank now chose one of the best of all apples, the Gravenstein, for special training. Thousands of seeds of this fruit were planted, and thousands of young tree pupils were soon in training. Selecting the best from this vast number would seem an impossible task for most people, but Burbank has hundreds, and sometimes thousands, of such experiments under way at one time. Selections are made by him, but assistants do the planting, cultivating, and grafting.

The Gravenstein pupils remained in the school for many years that the best might be found, then an apple was graduated which ripens later than the Gravenstein, and is called the Winterstein. The trees are strong and heavy bearers. The large, juicy apples are yellow, with stripes of rosy red.

Believing it possible that another good apple could be improved, he chose the Newtown Pippin as a pupil. Many seeds were planted, and when promotions were made, the



THE GOLD RIDGE APPLE

best were selected from the thousands. After years of training another apple was graduated, and given the name of the school, "Gold Ridge." This is a pale yellow apple, with a crimson blush on one side. It is large, smooth, of beautiful form and fine quality. It ripens earlier than its ancestor, the Newtown Pippin. Thus one of Nature's oldest fruit children has been cherished, nurtured, and trained by the teacher, and no doubt other apple graduates will go forth from the school and send their rich fruit to happy firesides to grace the golden winter evenings passed by circles of joyous friends.

CHAPTER XXXVIII

THE BIRDS' FEAST

It was one bright morning early in autumn that the workmen of the plant school were attracted by an unusual chatter in one of the walnut trees on the grounds.

"Ah, I see," said the master when he came on his rounds. "You birds have found my paper shell walnuts." And sure enough, as he came closer, he saw a pretty nuthatch "auck, auck-aucking," and then burrowing with his long, pointed bill into the thin-shelled walnuts. "I see," he repeated to himself. "I've made those shells too thin." Then he realized that the birds were having a grand feast.

A big, flashily dressed yellowhammer, forgetting his

busy task of "thwack, thwack, thwacking," on the barn eaves, had come to see about the discovery of the nuthatch. From his hunting ground among the thornless blackberry bushes the towhee came calling "chewink, chewink, chewink." Three catbirds, being attracted by the noise, flitted to the walnut-trees and soon cried out, "Zuay, zuay," while two sap-suckers, who had been the lone occupants of the walnut plot, before the nuthatch made his discovery, circled around the trunk of a large tree, one after the other. They occasionally stopped to listen to the din caused by a number of jays fishing about, screaming and scolding excitedly their "ike, ike, ike," seeming to say, "At last we have found the prize, we can get the walnut kernels now."

The woodpecker was the wisest bird among the visitors, for he ceased his "ka-rah-ka" and darted off to a near-by grove with a walnut in his beak, no doubt in search of a dead tree trunk in which he could lay up his winter's store.

The master stood for a time watching his little feathered friends. He did not want to harm them, for they are very useful in destroying insects that injure the trees and fruit, but he finally decided that he would have to train his walnut trees to bear nuts with thicker shells, although it took him many years to train a tree to bear such thin-shelled nuts.

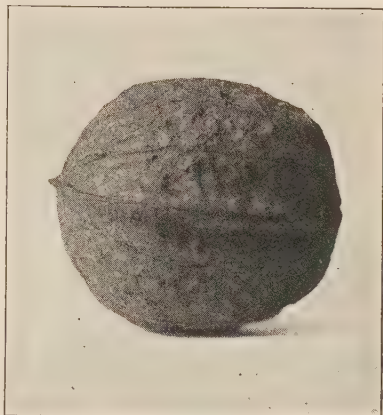
Years and years ago most of the walnuts were brought into California from France, Germany, and England. At

that time nuts were considered unwholesome. They were not eaten as daily food, for those then offered for sale, in the stores, were tough; the kernel was sometimes covered with mould; the skin over the kernel was dark and contained a large amount of tannin, a chemical substance used in tanning leather. This tannin caused the mouth to smart and burn when the nut was eaten. But, worst of all, many of the nuts had worms in them and could not be used at all. The nuts then raised in California were of different sizes and shapes, and many contained the puckery tannin.

While searching for a better nut to train, the master heard of a tree in the business section of San

Francisco which bore delicious nuts in abundance. The tree was to be immediately destroyed, as the ground was needed for building purposes. He purchased the last crop of nuts which this valuable tree produced, every one of which was planted.

The trees resulting were mostly quite ordinary, but two or three bore nuts in every respect even better than the nuts produced by the original tree. From the best two of



Santa Rosa walnut.

these many more were raised. Among these, two still better ones appeared. After a time a tree was produced which yielded nuts when only three years of age, and every succeeding year its limbs were full of fine sweet nuts, which were almost round. The shell was very light-colored and thin. The skin covering the meat was pale yellow, almost white, and contained none of the puckery tannin found in the older varieties of nuts.

This nut ripens a month or more before other walnuts are ready to harvest. In the coast counties of California, where there is much fog, it is sometimes subject to blight, like most other walnuts, but being so early, so delicious, so fine in appearance, and the trees so very productive, it is a proof of what selection alone can do.

Thousands of walnut trees are now growing which have been grafted to the "Santa Rosa Soft Shell."

The "ka-rah-ka" of the woodpecker and the "ike, ike, ike" of the blue jay are sometimes yet heard in the walnut trees, although the master chose for grafts those with somewhat thicker shell than the first produced.

CHAPTER XXXIX

THE ATHLETES

One might think it impossible for the students of a plant school to engage in athletics, but, really, it is quite as feasible as for our boys and girls of the grammar and high schools to enjoy the low hurdle or the running high jump.

The athletes in the Burbank plant school seem to be among the tree pupils. Of these, the walnut takes the lead. To most people it would seem impossible to improve the slow-growing black walnut tree; in fact, so far as is known, Burbank is the first man to try to break the life habits of a tree.

The first two walnut pupils were the native California black walnut and the English walnut. Pollen was taken from the English walnut and placed on the stigma of the black walnut, and when the nuts ripened they were planted. The young trees were allowed to grow until they were large enough to be grafted onto the arms of a strong, large walnut tree. When these grafts bore fruit, other trees were raised. The process continued until as many as ten thousand walnut pupils were found in the school at one time. Athletes were to be selected from among ten thousand.

Among these ten thousand many strangely clad were seen. The leaves of some were small and had from three

to seven leaflets on either side of the stem; others were large, with nine, eleven, and fifteen leaflets. Some were rough, others glossy, others smooth. Many of the young trees resembled the black walnut, many the English, while some were unlike either parent tree. Some of the trees grew slowly, others were hustlers. One of the fastest growers carried a perfume, for the leaf when crushed gave a delightful fragrance resembling that of an apple and as lasting as the odor of the violet.

The variation in nuts that these trees bore was almost as great as that of the leaf. There were large nuts and small nuts; nuts with thick shell and bitter kernel, and some with thin shell and sweet kernel. Some trees were heavy bearers, others bore very little fruit, and some, none.

But as the master was training this especial class in rapidity of growth, the best young racers were placed in long rows in the school. We feel sure they were as strictly attentive to the orders of the coach as if they were intending to train for Olympic games. No strong drink nor tobacco were indulged in, and as for keeping late hours, why, they were ready to sing good-night with the sunset breezes and to awaken in the morning at the first call of birds in the tree tops.

As the training progressed there were many try-outs, and as the coach selected the fastest growers for further team-work, no doubt great rounds of "rah, rah, rah" were sent up by the admiring plant pupils for the victors.

After years of patient labor the coach chose from among



FOUR NEW PEACHES

Left—first two "The National"; third (on top) "The Leader"; fourth "Inability"; fifth "Exquisite"

his Paradox pupils a team of six young athletes. These he placed in the hard earth along the street in front of his dwelling. They must now do their best without further training, and receive no nourishment other than that gathered through their own efforts.

Across the street opposite the athletes stood another row of trees. These were the English walnut. They had more than fifteen years the start of the Paradox and were in highly cultivated soil; but the athletes had been in training, you know, so they must have felt quite sure of winning.

In a plant school a race extends through a period of years instead of a few seconds, as in a school for boys and girls.

How those young Paradox racers ran! The slogan for the race was "Smash the record," and they seemed determined to smash it. At the end of the third year such enormously long arms had been sent out and such thickness of body was displayed that they began to create quite an excitement in the community. Even the passer-by observed the swiftness. No doubt the other plant pupils gazed with admiration across the fence at their team, and as the wind whistled through their branches sang:

"We will love you, 'Doxies,' if you beat them,
We'll stand by you, 'Doxies,' if you don't,
You surely are the cream,
You're the picked, the winning team,
You're our own 'Doxies'!"

Those Paradox racers took courage, surely, as the student yells were sung by the breezes and echoed and re-echoed from "Doxie" to "Doxie."

The excitement and general interest became intense as farmers, laborers, and merchants came and went along the street between the two rows of trees. Burbank's walnut pupils on one side of the street increased at an incredible rate, being encouraged by the class yell:

"Rah! Rah! Rah!

Who are we?

We are the 'Doxies,'

The winning tree."

The sturdy English walnuts across the street continued the same slow pace that had been theirs for years. For fourteen years the race continued, then the timekeepers called the finish. It was evident that the trained athletes had won the race, for the announcement was published far and wide that the Paradox had grown in fourteen years almost six times as much as the English had in thirty years, and at the height of six feet from the ground some of the winning trees were six feet in circumference, while their branch spread was seventy-five feet.

Of course there was great rejoicing in the school. Why not? The race was fairly won; besides, the "Doxies" had shown more "class" than their opponents.

The judges, however, were tradesmen of different kinds.

They came forward with grave and knowing faces. The lumberman declared: "The grain of all rapid-growing trees



Royal hybrid walnut tree.

is very soft; therefore, the wood is unfit for interior finishing and cabinetwork; for strength and durability the wood from trees of slow growth is unequalled."

The coach, being wise, and ready for such criticism, had prepared a limb of the Paradox athletes for inspection.

As the lumberman continued his sarcastic speech, a block from the Paradox was handed to him. He immediately took his knife from his pocket and tested the wood for hardness. His fingers passed rapidly over the smooth, sawed surface. His grave countenance quickly took on a look of vexation as he reluctantly acknowledged that the Paradox not only equalled but excelled the older varieties of walnut wood in hardness and beauty.

At the beginning of the lumberman's remarks the uncultivated plum pupils surely looked very sour, and as he continued his harangue there was a fearful bz-z-z-z among the pines; but when at last he was forced to admit defeat, who can blame the rooters for the cry:

“Give 'em the axe, axe, axe,
Give 'em the axe, axe, axe,
Give 'em the axe,
Give 'em the axe,
Give 'em the axe,
Where?”

“Right in the bark, bark, bark,
Right in the bark, bark, bark,
Right in the bark,
Right in the bark,
Right in the bark,
There!”

Quiet again being restored, the cabinetmaker and the polisher took the stand. The cabinetmaker examined the wood and, with his pocket rule laid across the surface of the block, exclaimed:

“Why, the annual growth is fully an inch—an excellent lumber for furniture, veneers, and ornamental woodwork.”



Two-year-old chestnut tree with its second crop.

Then the polisher applied his test, and announced the wood unexcelled for smoothness and fitness for polish.

Now came a fearful rebuff from the friends of the English.

"The Paradox has not won all the points," said they. "See what a quantity of rich nuts these beautiful trees bear, while the Paradox bears very few."

The judges shook their wise heads and said, "Who ever heard of racers bearing heavy loads?"

At this the bleachers almost went wild.

'Zip! Boom! Bah!

Rah! Rah! Rah!

Ninety million, eighty thousand, seven, sixty-seven

That's what they think they bear,

They bear but ten or 'leven."

The judges were united in this general conclusion:

"As the Paradox will grow faster than any other tree of the temperate zone, it will, no doubt, prove a blessing to mankind in reforesting the earth."

My! what a noise when this was announced.

One popular athlete proudly remembered by the pupils of the plant school was the chestnut. When Burbank was a boy it required from ten to twenty years for a tree to bear. The master's desire was to perfect his childhood friend. After much expense and years of patient waiting, a combination of the American chestnut and the Japanese chestnut resulted in a tree that produced nuts in less than two years.

How the pupils of the plant school shouted when they heard the glad news:

“Rah! Rah! Rah! Rah!

Nuts a-plenty!

Nuts in two years

’Stead of twenty.”

CHAPTER XL

THE SEED ROOM

Before leaving the plant school we must take a peep into the large, light seed room. There are shelves at the sides of the room from floor to ceiling, on which the seeds are arranged alphabetically. No doubt you can readily tell some of the seeds on the A and B shelves, but what seeds fill the X, Y, and Z shelves?

The larger and heavier seeds are in strong cloth bags; then there are paper bags of all sizes down to the little seed packages seen on sale at the stores.

On the long work table is a pair of delicately balanced scales, and tiny measuring cups, some of which are less than one-fourth the size of a thimble; yet some seeds are too small for even this measure, and are lifted on the point of a penknife.

After the seeds have been carefully gathered, dried, and

cleaned, they are brought here to be weighed, measured, assorted, plainly labelled, listed, and placed on the shelves. In handling seeds the greatest accuracy and most perfect system is required, as any confusion would result in serious trouble. Here, as in all the departments, careful memoranda are made, giving time of planting of each kind, and other points which must be observed. These seeds are for next season's planting for experimental purposes. Any, however, not required are either sold in bulk to the large seed houses or put up in small packages for the retail trade.

Be careful, as you pass the table, for with a breath you might blow away the value in many dollars of those tiny, feathery seeds; and some are priceless, perhaps the only seeds of a new variety, which cannot be replaced.

Some choice lilies were once growing near the road at the Gold Ridge farm. One morning the gate was left open for a short time, and a child passing saw the lilies and broke one off, doubtless intending no harm. The children are generally very careful not to injure Burbank's plants, well knowing that he is always glad to fill their arms with flowers when he has time to gather them. Therefore, the little girl did not take the most beautiful lilies, but one stalk having only a few fresh blooms at the top of a long stem, which was becoming ragged with faded flowers and ripening seed pods. It chanced that for this very seed the master had waited years, as it was the combination of two choice lilies which bloomed at different seasons. One

opened its beautiful flowers in early spring, while the other came in summer. In order to make the combination, the habit of each must, by long-continued training, be changed. Year after year one of the lilies had been trained to bloom a little later each season, and the steps of the other had



In the bulb room.

been hurried, until June of that year found each with opening petals. Then the golden pollen had been brought from lily number one just as lily number two was ready to receive it. But now, by one thoughtless act, the work of years was undone, and the precious seed was gone. Can you imagine his grief when he discovered the loss, knowing, as he did, that no seed like it had ever before

existed? A careful search was made to discover if even one seed could be found. The faded flowers and seed pod had been hastily stripped from the stem and thrown down upon the sandy soil as worthless. A few of the precious seeds were rescued and the experiment saved to science.

What curious packages! Yes, those seeds were gathered by the children of South America; those are from the mountains of China; and there are many others that speak to us of distant lands and of strange scenes and customs. Then what treasures are here! Can you imagine the mischief one little mouse might do in this room? Giant trees, sturdy shrubs, and fragile flowers are sleeping here. Can you tell what plant is hiding in this seed? As Burbank holds a seed in his hand, he knows its nature and understands what conditions are necessary for its germination* and development.

Some seeds may be kept for years; others must never be allowed to become dry. Some will germinate only under glass, requiring the warmth and moisture of the conservatory; others must be boiled in water for five or ten minutes, while still others must be frozen in order to allow the little plantlet to escape from the hard shell. The conditions depend largely upon the surroundings to which its ancestors were accustomed, seeds of plants from tropical countries requiring very different treatment from those of

* Germination—the first act of growth.

colder regions. There are, however, many other points to be considered, for seeds have many strange and interesting habits. Near the geysers in California, where forest fires are frequent, there grows a kind of pine having cones that never open until a fire has burned over the hillsides, destroying vegetation. Then these cones burst open, the seeds escape from their prison-houses and, falling upon the ground, now cleared to make room for them, thick forests of young pines spring up.

A seed is an egg, a plant egg; for within the shell or covering is a little undeveloped plant; and snugly packed with it is a supply of food for its nourishment, when it first awakens, before it becomes able to gather its own nourishment from earth and air. The different parts of a seed can be readily seen with the aid of a good pocket microscope, which one is well repaid for carrying, as it reveals much of wonder and beauty in the varying structure of seeds, almost equalling that of flowers. And seeds are everywhere. They float on the water, fly in the air, carpet the earth, and sleep in the ground beneath our feet. Without the product of seeds the earth would be brown, not green. In seeds, lie sleeping a future generation of plants, only awaiting certain conditions of moisture, heat, and light to awaken them.

The destruction of a blossom prevents the development of the seeds. Have you ever seen a flower blooming in field or forest, with joy written in its every line of beauty,

carelessly torn up and thrown down by the dusty roadside? Did you watch it shrink, shrivel, and die? No seeds were ripened for another season's growth. In just this way many of our most beautiful wild flowers are becoming each year less plentiful.

Although the life of each plant begins and ends with the seed, yet each has a definite work to perform. They are sometimes spoken of as idly dancing in the sunshine. In reality they are very busy creatures, no doubt finding joy in their work. The poet Wordsworth says:

“And 'tis my faith that every flower
Enjoys the air it breathes.”

Not only do plants in the days of summer gather nourishment for their own life and growth, and prepare food for the little baby plants hidden in the seeds, but it is to their industry that we look for our food and much of our clothing, fuel, and shelter. If for one season they ceased to work, there would be no life on the earth.

The population of the world is increasing. Cities are growing very rapidly and food is becoming each year higher in price. Better and larger crops must be produced. It is then to better and more productive seeds that the nations are looking for food for the increasing millions.

Now let us consider what would be the result in the food supply if, in grains alone, snugly packed in each little

plant nest there might be only one more egg. The master tells us that if a new wheat, barley, or oats could be obtained that would produce one more grain to each head, or a corn that would produce an extra kernel to the ear, in the United States alone, we should have annually, without any more cost of labor, 5,200,000 extra bushels of corn, 15,000,000 extra bushels of wheat, 20,000,000 extra bushels of oats, and 1,500,000 extra bushels of barley.

May your work in coming years be, like that of the master of the plant school, adding to the beauty of the earth and to the food of the nations, and so hastening the "happy day when man shall offer his brother man, not bullets and bayonets, but richer grains, better fruits, and fairer flowers."

CHAPTER XLI

ARBOR DAY PROGRAMME

March 7, the birthday of Luther Burbank, was in 1909 designated by the Governor of California as Arbor Day, to be observed in the public schools of the State by planting trees, vines, and flowers, and by appropriate literary exercises. In many other States the day is also observed in the same way, and proves a source of pleasure and inspiration to make homes as well as schools more beautiful.

The following may be an aid to the teacher, and can be adapted to the different grades.

In decoration of the schoolroom, use as many Burbank creations as are at hand, fruit, flowers, etc. Live flowers growing in pots or boxes are to be preferred to cut flowers. Pictures of the scientist, his home, and experimental grounds may be placed on the wall. Fruits and flowers drawn on blackboard are excellent decorations.

Poems:

“Painter of Fruits and Flowers”.....Whittier.

“Birthday of Agassiz”.....Longfellow.

“Building of the Birch Canoe”.....Longfellow.

Sonnet—“Luther Burbank”.....Mary Belle Williams.

Quotations from Burbank by older pupils.

Story of his creations: Shasta daisy, Eschscholtzia, cactus, plumcot, and others. The children may represent these plants.

Music to be selected by the teacher.

Planting of a Burbank tree and other trees and plants. At this time the teacher should emphasize the care of these plants and see that they do not suffer neglect as the months pass.

For younger children a more simple programme should be arranged. Oral reproduction of the stories with appro-

priate selections from any of the numerous books of Nature poems would give them greater pleasure. It will not be difficult to find suitable poems for each plant school story. The length of programme will, of course, depend upon the time allowed.

SUGGESTIONS

- Story —“The New England Flower Garden”
 Poem —“Great-Grandmother’s Garden” . . . M. J. Jacques.
 Story —“Miss Eschscholtzia”
 Poem —“The Poppy” Jane Taylor.
 Story —“The Shasta Daisy”
 Poem —“A Field Flower” James Montgomery.
 Story —“The Sunset Class”
 Poem —“Fashions at the Court of Queen Flora”
Lydia H. Farmer.
 Music—“Tree Planting” (Tune, “America”)
Samuel F. Smith.

QUOTATIONS FROM LUTHER BURBANK

- I. “Ignorance is the only unpardonable sin.”
- II. “No man ever did a great work for hire.”
- III. “Let us be brave harvesters in the broad field of thought.”
- IV. “Be gentle, and gentle people come to you from near and far.”

V. "The man who cannot say no, never gets the opportunity to say yes."

VI. "Be just and generous, and the world sends you just and generous companions and friends."

VII. "Flowers always make people better, happier, and more hopeful; they are sunshine, food, and medicine to the soul."

VIII. "The farm is the foundation of our best manhood and womanhood, the true hope and strength and glory of the world."

IX. "The greatest happiness in the world is to make others happy; the next greatest is to make them think."

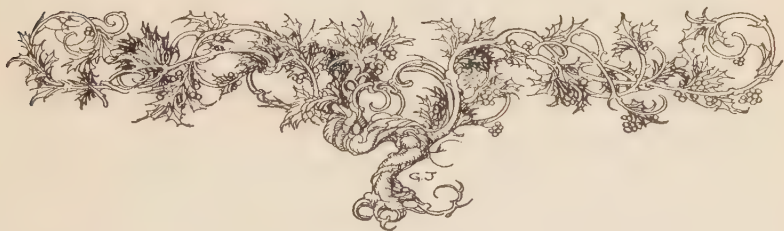
X. "I shall be content if because of me there shall be better fruits and fairer flowers."

XI. "It is very natural that we should associate flowers and children, as they are so much alike in many respects, and should in some points be treated alike."

XII. "Every child should have mud pies, grasshoppers, water bugs, tadpoles, frogs, mud turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade, water lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries, and hornets; and any child who has been deprived of these has been deprived of the best part of his education."

XIII. "If we love and admire our friends, let us tell them so to-day. It does them no harm, and they will pass along the kindness. Yesterday is not ours, to-morrow may not be; tell them to-day."

XIV. "I love sunshine, the blue sky, trees, flowers, mountains, green meadows, sunny brooks, the ocean when its waves softly ripple along the sandy beach, or when pounding the rocky cliffs with its thunder and roar, the birds of the field, waterfalls, the rainbow, the dawn, the noonday, and the evening sunset—but CHILDREN above them all."



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In reading, the words after the comma (where they occur) are to be read first; thus "Rhubarb, New Giant Crimson Winter" is read "New Giant Crimson Winter Rhubarb."

The references are to pages. Where two pages are separated by a dash the meaning is "and included pages"; thus 76-80 means 76, 77, 78, 79, 80.

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